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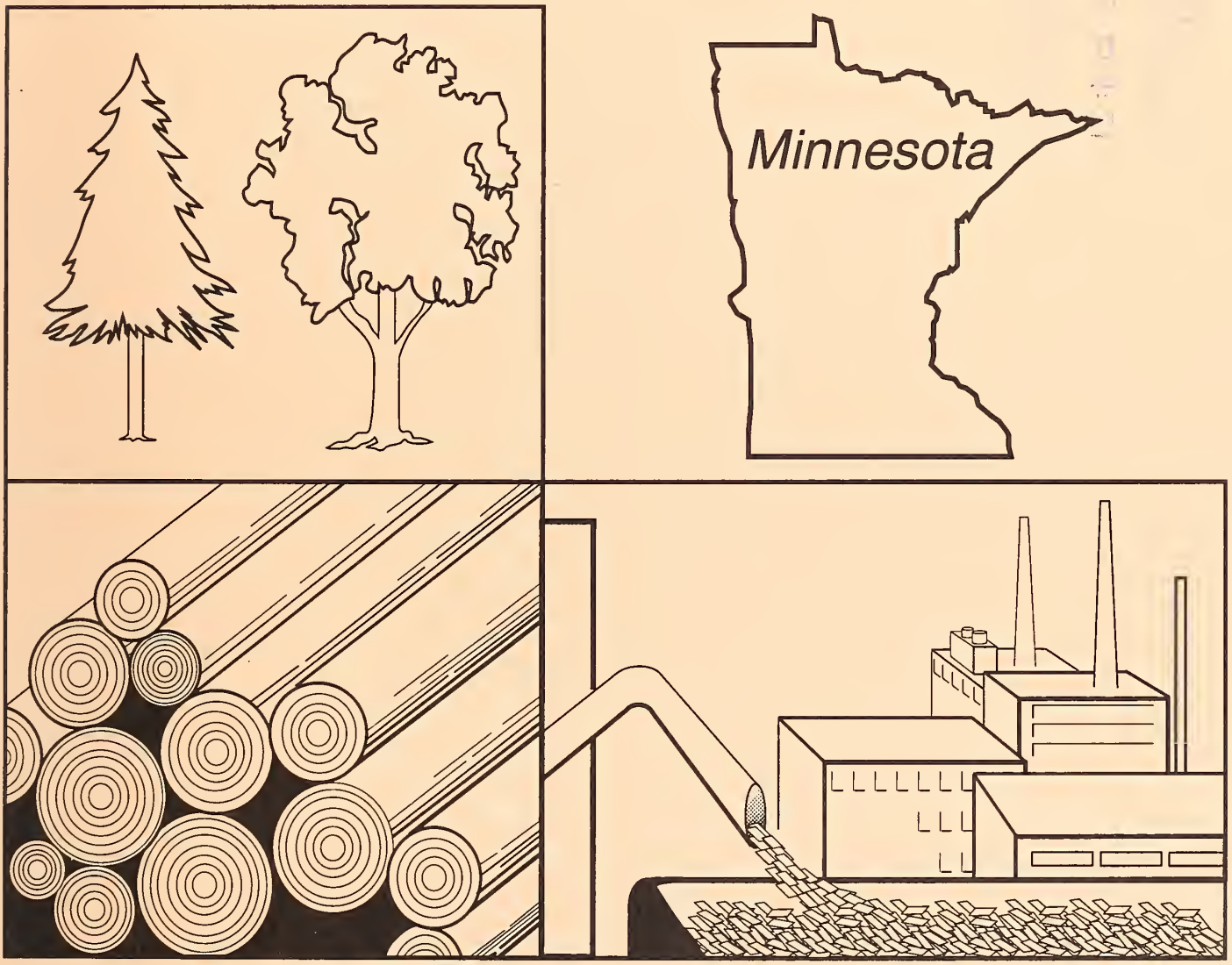
Resource Bulletin
NC - 186

Minnesota Timber Industry - An Assessment of Timber Product Output and Use, 1992

Ronald L. Hackett and Richard A. Dahlman



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1992 Folwell Avenue
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Manuscript approved for publication September 19, 1997
1997

FOREWORD

In this bulletin, we discuss recent Minnesota forest industry trends and report the results of a detailed study of forest industry, industrial roundwood production, and associated primary mill wood and bark residue in Minnesota in 1992. Such detailed information is necessary for intelligent planning and decisionmaking in wood procurement, forest resource management, and forest industry development. Likewise, researchers need current forest industry and industrial roundwood information for planning projects.

Special thanks are given to the primary wood-using firms for supplying information for this study and to the Minnesota Department of Natural Resources for canvassing the respondents. Their cooperation is greatly appreciated.

All board foot data in this report have been converted to International 1/4-inch scale by applying a multiplier of 1.08 to all saw-log volume reported in Scribner Decimal C scale by sawmills, a multiplier of 1.04 to all veneer-log volume reported in Scribner Decimal C scale by veneer mills, a multiplier of 1.38 to all saw-log volume reported in Doyle scale by sawmills, and a multiplier of 1.14 to all veneer-log volume reported in Doyle scale by veneer mills.

The last published report from a detailed study of all industrial roundwood output in Minnesota was in 1990. Most comparisons in this report are with the 1990 study results. Row and column data of tables may not sum due to rounding, but data in each table cell are accurately displayed.

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Minnesota Timber Industry—An Assessment of Timber Product Output and Use, 1992

Ronald L. Hackett and Richard A. Dahlman

HIGHLIGHTS

PRIMARY TIMBER INDUSTRY—INDUSTRIAL ROUNDWOOD

- In 1992, Minnesota's primary wood-using industry was comprised of 596 mills, 24 more than in 1990 (table 1). Most of the increase was in small sawmills processing less than 1 million board feet of lumber annually.
- Most of the State's primary wood-using mills are located in the two northern Forest Survey Units (fig. 1).
- In 1992, Minnesota's primary wood-using industry processed 264 million cubic feet of roundwood, or 13 percent more than in 1990 (table 2).
- Minnesota's 16 pulpmills processed 198 million cubic feet of roundwood in 1992, an increase of 11 percent from 1990. This total was three times as much as that processed by the numerous sawmills and other industrial roundwood mills combined and more than three-quarters of all roundwood processed.
- Hardwoods made up 3 out of every 4 cubic feet of roundwood processed by the State's primary wood-using industry in 1992.
- In 1992, 269 million cubic feet of industrial roundwood was harvested from Minnesota's forest—a 15-percent increase from 1990 (table 3). Softwood and hardwood roundwood production increased 7 percent and 18 percent, respectively.
- The increase in softwood production was associated with the increased use of jack pine for saw logs and the increased use of red pine for utility poles and pilings.
- The increase in hardwood production was associated with the increased use of aspen for pulpwood.
- Pulpwood remained the predominant roundwood product harvested from Minnesota's forests in 1992.

PULPWOOD

- Minnesota produced a record high of nearly 2.7 million cords of pulpwood (including mill residues) in 1992. This volume was 13 percent higher than the 1990 production of nearly 2.4 million cords, based on the North Central Station's annual study of pulpwood production. Pulpwood includes all fiber-based products made from roundwood, including particleboard, oriented strand board (OSB), waferboard, and engineered lumber, etc. (table 4).
- Pulpwood remains the leading industrial roundwood product in Minnesota, accounting for 75 percent of the State's total roundwood output. Between 1990 and 1992, roundwood pulpwood production increased 313 thousand cords to nearly 2.7 million cords.

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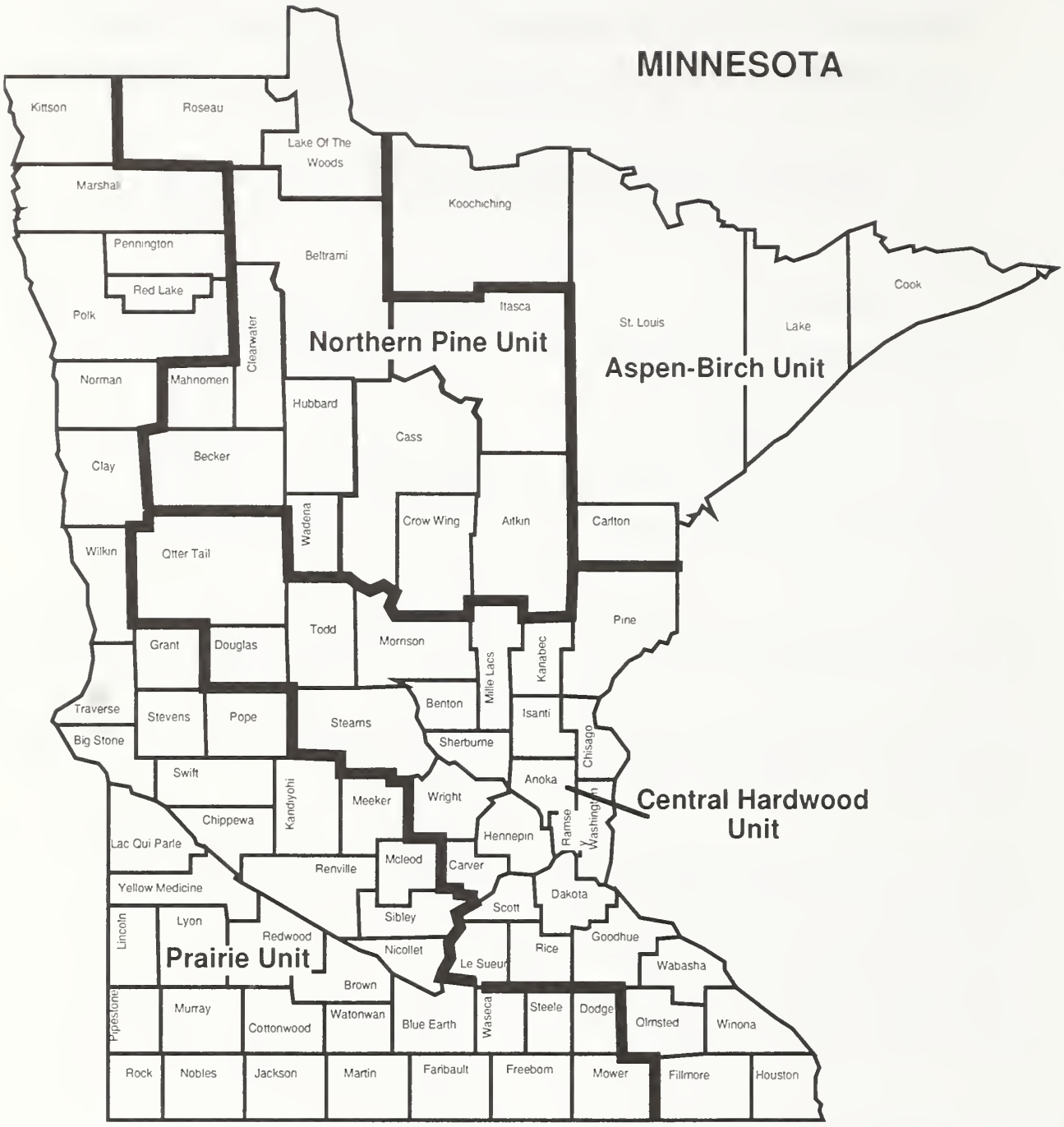

Figure 1.—*Forest Survey Units in Minnesota.*

- Of the 2.7 million cords of pulpwood production in Minnesota in 1992, only 2.6 million cords was roundwood or chips from roundwood, the remaining 1 million cords was primary wood-using residues from saw and veneer mills.

- Minnesota exported a total of 152 thousand cords of roundwood and residues to Wisconsin and Canada. Sixty-one thousand cords of softwood, primarily spruce (31 thousand cords) was exported to Wisconsin and Canada. Aspen and white birch were the only major hardwood roundwood species exported (table 5).

- Aspen made up 77 percent of the roundwood cut for pulpwood in 1992 (fig. 2 and table 6). The Northern Pine Unit accounted for 54 percent of the aspen harvested in Minnesota. St. Louis and Itasca Counties pulpwood roundwood production each amounted to more than 300 thousand cords of aspen and more than 400 thousand cords of all species in 1992.

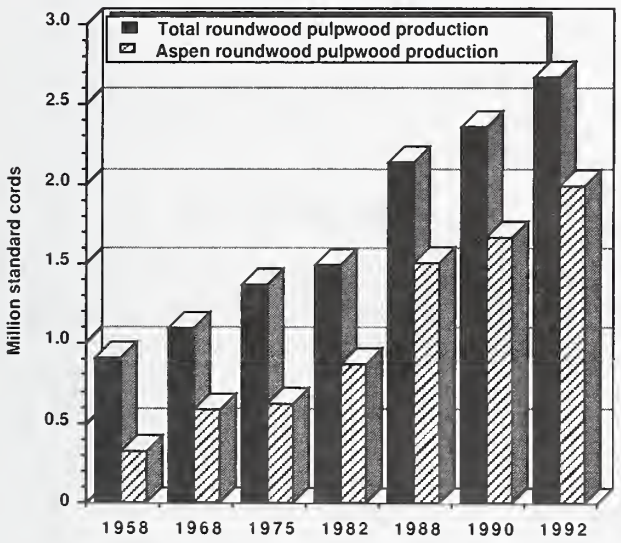

Figure 2.—Pulpwood production of aspen and all species in Minnesota for selected years.

- Pulpwood receipts in Minnesota amounted to more than 2.6 million cords (including mill residues) or 14 percent more than in 1990 (table 7).

- In 1992, Minnesota imported from Wisconsin, Michigan, and Canada 87 thousand cords of roundwood and mill residues or more than 3 percent of its receipts of roundwood used for pulpwood products (table 8).

- The largest proportion of these imports of pulpwood harvested, 64 percent, came from Wisconsin and was mainly aspen and balsam fir (table 9).

- The trend toward increased use of low quality hardwoods should continue as developing technologies allow more applications, such as engineered lumber, OSB, composite panels, and other materials.

SAW LOGS

- Saw logs accounted for nearly 22 percent of the State's total roundwood products output in 1992. Saw logs rank second behind pulpwood in roundwood production.

- Production and receipts of softwood saw logs between 1990 and 1992 increased 55 and 78 percent, respectively. At the same time hardwood saw-log production and receipts increased 22 and 28 percent, respectively (table 10).

- Minnesota is a net exporter of saw logs. In 1992, the State sent 6 percent of its saw-log production, more than 19 million board feet, to mills in Wisconsin, Iowa, Canada, Michigan, and North Dakota. The major species exported were red oak, white oak, and cottonwood (table 11).

- Major saw-log species harvested in 1992 were aspen, jack pine, red pine, and red oak. Aspen saw-log production increased by more than 19 percent between 1990 and 1992, from 82 million board feet to 98 million board feet.

- In 1992, the Northern Pine Unit accounted for nearly 45 percent or 175 million board feet of saw-log product output in Minnesota. Itasca was the leading county, with 43 million board feet of saw logs harvested in 1992 (table 12).

- Saw-log receipts in 1992 showed Wisconsin exporting 22 million board feet to Minnesota, mainly red, white, and jack pine. Canada exported more than 3 million board feet, mainly aspen and jack pine. Iowa provided more than one million board feet, mainly red and white oak (table 13).

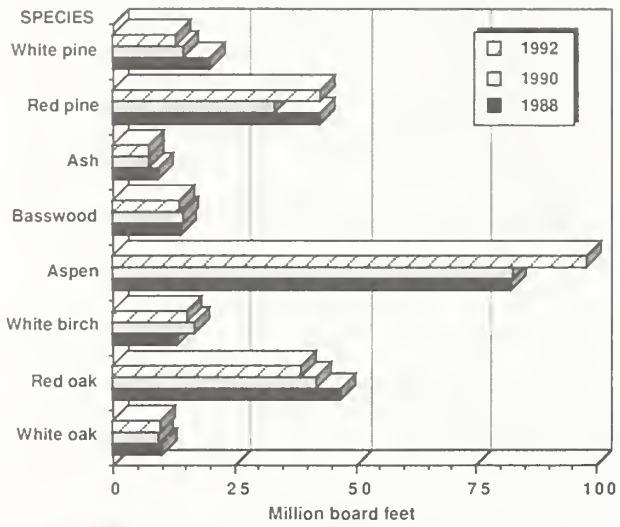

Figure 3.—*Saw-log production by select species in Minnesota, 1988 to 1992.*

VENEER LOGS

- Veneer production between 1990 and 1992 increased by only 4 percent to 17.4 million board feet (table 14). Veneer accounted for more than 1 percent of the State's output of all roundwood timber products in 1992, about the same as in 1990.

- Basswood, cottonwood, and hard maple accounted for the increase in veneer-log output, while white oak, red oak, and black walnut showed a decline in veneer-log production (table 15).

- Minnesota is a net exporter of veneer logs. In 1992, nearly 7 million board feet were exported to Wisconsin, Michigan, Ohio, and foreign countries (table 16).

- The Aspen-Birch Unit provided the most veneer, accounting for more than 48 percent of the State's veneer-log output. White birch species accounted for nearly half of the veneer-log production in the State (fig. 4).

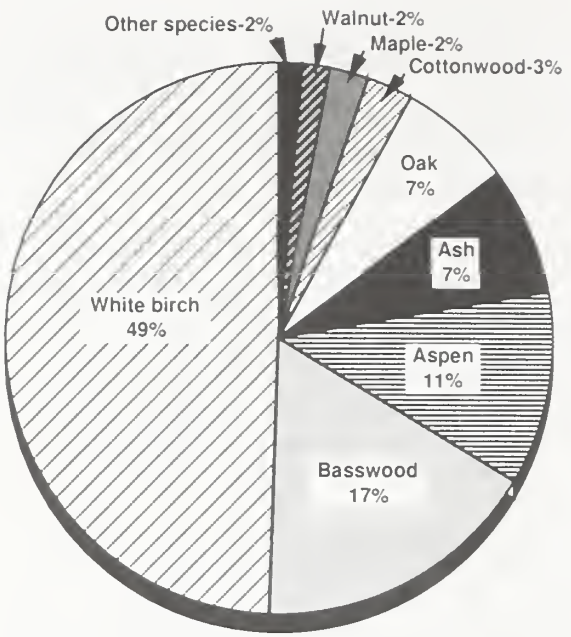

Figure 4.—*Distribution of veneer-log production for Minnesota, 1992.*

- For nearly three decades, Minnesota has not imported any veneer logs for primary manufacturing of products (table 17).

- White birch, aspen, and red oak were the only species reported as undergoing secondary processing in Minnesota in 1992 (table 18).

OTHER PRODUCTS

- Other industrial roundwood products totaling 4.2 million cubic feet (2 percent of all industrial roundwood) were cut in Minnesota in 1992 (fig. 5). These other products included roundwood harvested for commercial posts and poles, industrial fuelwood, shaving bolts, and excelsior bolts.

- In 1992, industrial fuelwood—roundwood harvested from timberland and used to fuel boilers for heat and/or electrical generation—production in Minnesota was 797 thousand cubic feet or 24 percent of the other products category. White birch was the major species cut for industrial fuelwood with 6,792 cords or 60 percent of the industrial fuelwood harvested in 1992.

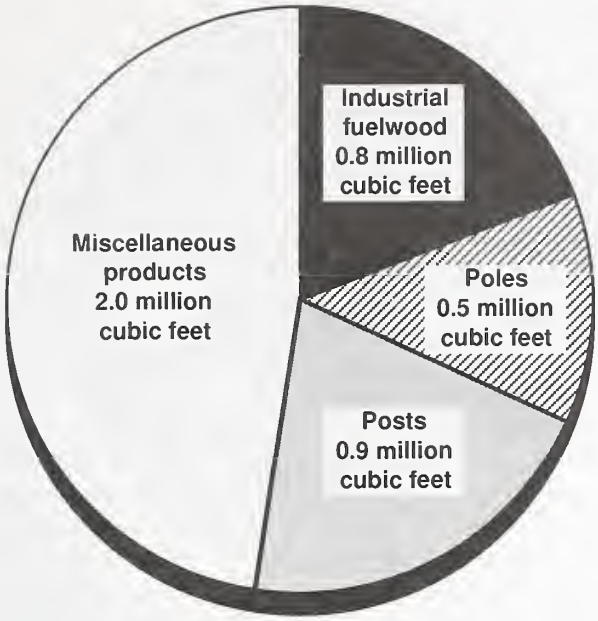
Industrial fuelwood 0.8 million cubic feet
Poles 0.5 million cubic feet
Posts 0.9 million cubic feet
Miscellaneous products 2.0 million cubic feet

Figure 5.—*Distribution of other products in Minnesota, 1992.*

- Miscellaneous products—shavings and excelsior—constituted 48 percent of the other products category; aspen was the leading species of miscellaneous products.

Residential fuelwood is a major nonindustrial product in Minnesota. The results of a residential fuelwood study conducted in 1994 will be available in a separate Station publication in the near future.

TIMBER REMOVALS

- In the production of industrial roundwood that occurred in 1992, 392 million cubic feet were cut. Only 31 percent of this total was left in the woods as harvest residues (table 19 and fig. 6).

- Aspen alone accounted for two-thirds of all growing-stock removals (table 20).

- Industrial roundwood harvesting also removed 823 million board feet of wood from the sawtimber portion of the growing-stock inventory in 1992 (table 21), a 14-percent increase over 1990.

- In 1992, more than half of all the sawtimber removals (51 percent) occurred in the Northern Pine Unit, the area of the State where pulpwood production is concentrated.

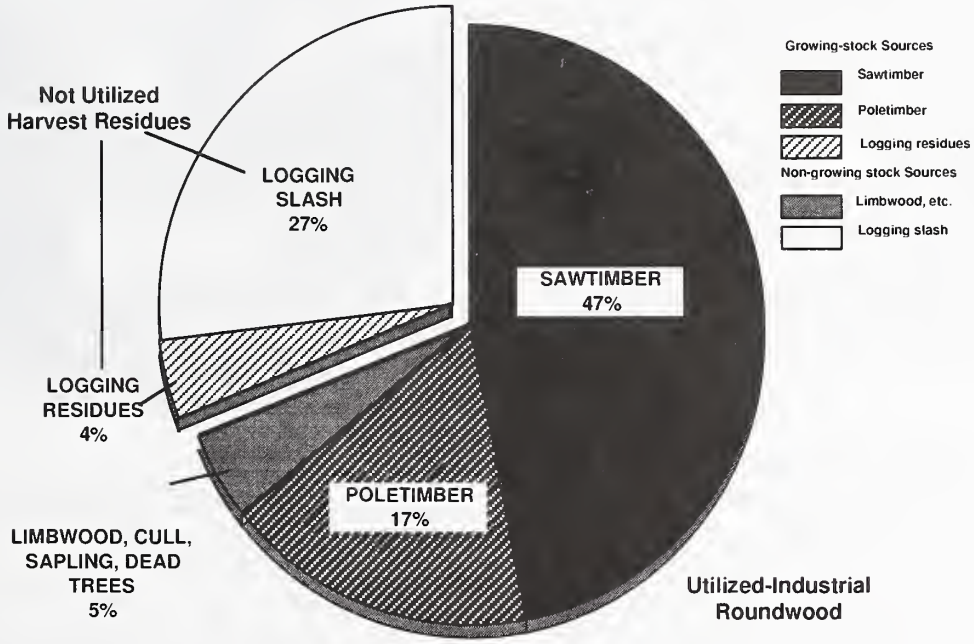

Figure 6.—*Distribution of material harvested for industrial roundwood by source of material, Minnesota, 1992.*

- Sawtimber removals were concentrated in three species in 1992—aspen, jack pine, and red pine—which together made up more than three-quarters of all sawtimber removals. Aspen alone accounted for more than 60 percent of all sawtimber removals.

HARVEST RESIDUES

- During 1992, loggers in Minnesota generated an estimated 123 million cubic feet of harvest residue (this does not include nontimberland removals). Logging residue consists of all unmerchantable wood fiber not used during logging operations on timberland.

- Aspen, balsam fir, jack pine, and red oak accounted for 82 percent of all harvest residues.

- Four counties—St. Louis, Itasca, Koochiching, and Cass—each produced more than 10 million cubic feet of harvest residue. All the units except the Prairie Unit had counties with more than a million cubic feet of residues.

PRIMARY MILL RESIDUE

- During 1992, Minnesota primary wood-using mills (except the pulp, particleboard, and waferboard mills) generated 469 thousand green tons of coarse residue, 270 thousand green tons of fine residue, and 855 thousand green tons of bark (table 23 and fig. 7).

- Ninety-two percent or more of all residues (coarse, fine, bark) generated at Minnesota primary mills was used (fig. 8).

- Pulpwood mills consumed 49 percent of the coarse residue for fiber products, and industry and households consumed 42 percent for fuel.

- Fine residue and bark were used primarily for industrial fuel, soil conditioner, mulch, livestock bedding, and poultry litter.

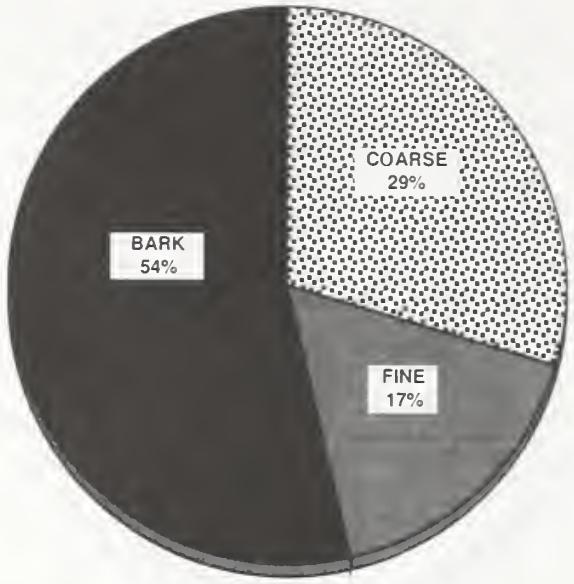

Figure 7.—*Distribution of residues generated by primary wood-using mills by type of residue, Minnesota, 1992.*

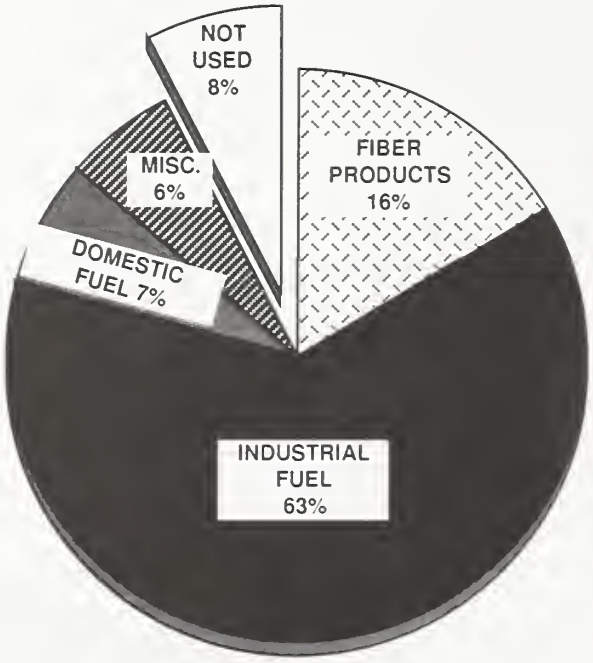

Figure 8.—*Distribution of residues generated by primary wood-using mills by method of disposal, Minnesota, 1992.*

APPENDIX

STUDY METHODS

This study was a cooperative effort of the Minnesota Department of Natural Resources (MDNR) and the North Central Forest Experiment Station (NCFES). Using mail questionnaires supplied by NCFES and designed to determine the size and composition of the State's primary wood-using industry, its use of roundwood, and its generation and disposition of wood residues, the MDNR canvassed all primary wood-using mills within the State. Followups to nonresponding mills, using additional mailings, telephone, and personal contacts, were made by the MDNR until a 100-percent response was achieved. Completed questionnaires were sent to NCFES for editing and processing.

As part of data editing and processing, all industrial roundwood volumes reported on the questionnaires were converted to standard units of measure using regional conversion factors. Timber removals by source of material and harvest residues generated during logging were estimated from standard product volumes using factors developed from logging utilization studies previously conducted by NCFES. Finalized data on Minnesota's industrial roundwood receipts were loaded into a regional timber removals database where they were supplemented with data on out-of-State uses of Minnesota roundwood to provide a complete assessment of Minnesota's timber product output.

DEFINITION OF TERMS

Board foot.—Unit of measure applied to roundwood. It relates to lumber that is 1 foot long, 1 foot wide, and 1 inch thick (or its equivalent).

Bolts.—Short logs that are no more than 16 to 20 feet long, to be sawn for lumber or peeled for veneer.

Central stem.—The portion of a tree between a 1-foot stump and the minimum 4.0-inch top diameter outside bark, or point where the central stem breaks into limbs.

Coarse mill residue.—Wood residue suitable for chipping such as slabs, edgings, and veneer cores.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, Osage-orange, and redbud.)

Cull removals.—Net volume of rough and rotten trees plus the net volume in sections of the central stem of growing-stock trees that do not meet regional merchantability standards, harvested for industrial roundwood products.

Dead removals.—Net volume of dead trees harvested for industrial roundwood products.

Diameter at breast height (d.b.h.).—The outside bark diameter at 4.5 feet above the forest floor on the uphill side of the tree. For determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

Fine mill residue.—Wood residue not suitable for chipping such as sawdust and veneer clippings.

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide.

Growing-stock removals.—The growing-stock volume removed from the timberland inventory by harvesting industrial roundwood products. (Note: Includes sawtimber removals, poletimber removals, and logging residues.)

Growing-stock tree.—A live timberland tree of commercial species that meets specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

Growing-stock volume.—Net volume of growing-stock trees 5.0 inches d.b.h. and over, from 1 foot above the ground to a minimum 4.0 inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous.

Harvest residues.—The total net volume of unused portions of trees cut or killed by logging. (Note: Includes both logging residues and logging slash.)

Industrial fuelwood.—A roundwood product with or without bark, used to generate energy at non-manufacturing facilities such as schools, correctional institutions, or electric generating plants.

Industrial roundwood products.—Saw logs, pulpwood, veneer logs, poles, commercial posts, piling, cooperage logs, particleboard bolts, shaving bolts, lath bolts, charcoal bolts, and chips from roundwood used for pulp or board products.

Industrial roundwood exports.—The quantity of industrial roundwood harvested in a geographical area and transported to other geographical areas.

Industrial roundwood imports.—The quantity of industrial roundwood received from other geographical areas.

Industrial roundwood production.—The quantity of industrial roundwood harvested in a geographic area.

Industrial roundwood receipts.—The quantity of industrial roundwood received by commercial mills in a geographic area.

Industrial roundwood retained.—The quantity of industrial roundwood harvested from and processed by commercial mills within the same geographical area.

International 1/4-inch rule.—A log rule or formula for estimating the board foot volume of logs, allowing 1/2 inch of taper for each 4-foot length. The rule appears in a number of forms that allow for kerf. In this form, a 1/4-inch of kerf is assumed. This rule is used as the USDA Forest Service standard log rule in the Eastern United States.

Limbwood removals.—Net volume of all portions of a tree other than the central stem, (including forks, large limbs, tops, and stumps) harvested for industrial roundwood products.

Logging residue.—The net volume of unused portions of the merchantable central stem of growing-stock trees cut or killed by logging.

Logging slash.—The net volume of unused portions of the unmerchantable (non-growing-stock) sections of trees cut or killed by logging.

Merchantable sections.—Refers to sections of the central stem of growing-stock trees that meet either pulpwood or saw-log specifications.

Net volume.—Gross volume less deductions for rot, sweep, or other defects affecting use for roundwood products.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial roundwood products. Classified in volume tables as rough trees.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 39.9-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, improved roads and nonforest strips must be more than 120 feet wide and more than 1 acre to qualify as nonforest land.).

Nonforest land removals.—Net volume of trees on nonforest lands harvested for industrial roundwood products.

Poletimber.—A growing-stock tree at least 5.0 inches d.b.h. but smaller than sawtimber size (9.0 inches d.b.h. for softwoods, 11.0 inches d.b.h. for hardwoods).

Poletimber removals.—Net volume in the merchantable central stem of poletimber trees harvested for industrial roundwood products.

Primary wood-using mills.—Mills receiving roundwood or chips from roundwood for processing into products such as lumber, veneer, pulp, etc.

Primary wood-using mill residue.—Wood materials (coarse and fine) and bark generated at manufacturing plants from roundwood processed into principal products. These residues include wood products (byproducts) obtained incidental to production of principal products and wood materials not utilized for some product.

Rotten tree.—A tree that does not meet regional merchantability standards because of excessive unsound cull.

Rough tree.—A tree that does not meet regional merchantability standards because of excessive sound cull. Includes noncommercial tree species.

Roundwood.—Logs, bolts, or other round sections cut from trees (including chips from roundwood).

Sapling.—A live tree between 1.0 and 5.0 inches d.b.h.

Sapling removals.—Net volume in saplings harvested for industrial roundwood products.

Saw-log portion.—That portion of the central stem of sawtimber trees between the stump and the saw-log top.

Saw-log top.—The point on the central stem of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber removals.—As used in table 19, sawtimber removals refers to the net volume in the merchantable central stem of sawtimber trees harvested for industrial roundwood products. (Note: Includes the saw-log and upper stem portions of sawtimber trees.) When referring to the sawtimber volume removed from the timberland inventory as in table 21, sawtimber removals refers to the net volume in the saw-log portion of sawtimber trees harvested for roundwood products or left on the ground as harvest residue, and is usually expressed in thousands of board feet (International 1/4-inch rule).

Sawtimber tree.—A growing-stock tree containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. and hardwoods must be at least 11.0 inches d.b.h.

Sawtimber volume.—Net volume in the saw-log portion of sawtimber trees.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Timber product output.—The volume of roundwood products produced from an area's forests.

Timberland.—Forest land that is producing, or is capable of producing, in excess of 20 cubic feet per acre per year of industrial roundwood products under natural conditions, is not withdrawn from timber utilization by statute or administrative regulation, and is not associated with urban or rural development.

Tree.—A woody plant usually having one or more perennial stems, a more or less definitely formed crown of foliage, and a height of at least 12 feet at maturity.

Upper stem portion.—That portion of the central stem of sawtimber trees between the saw-log top and the minimum top diameter of 4.0 inches outside bark, or to the point where the central stem breaks into limbs.

Veneer log.—Logs to be used in the production of plywood, finished panels, or veneer sheets, both rotary cut and sliced.

COMMON AND SCIENTIFIC NAMES OF TREE SPECIES MENTIONED IN THIS REPORT

SOFTWOODS

Jack pine ..... *Pinus banksiana*
Red pine ..... *Pinus resinosa*
Eastern white pine ..... *Pinus strobus*
Spruce:
  White spruce ..... *Picea glauca*
  Black spruce ..... *Picea mariana*
Balsam fir ..... *Abies balsamea*
Eastern hemlock ..... *Tsuga canadensis*
Tamarack ..... *Larix laricina*
Northern white-cedar ..... *Thuja occidentalis*
Eastern redcedar ..... *Juniperis virginiana*

HARDWOODS

White oak
  White oak ..... *Quercus alba*
  Bur oak ..... *Quercus macrocarpa*
  Chinkapin oak ..... *Quercus muehlenbergii*
  Swamp white oak ..... *Quercus bicolor*
Red oak
  Northern red oak ..... *Quercus rubra*
  Black oak ..... *Quercus velutina*
  Northern pin oak ..... *Quercus ellipsoidalis*
Hickory
  Bitternut hickory ..... *Carya cordiformis*
  Pignut hickory ..... *Carya glabra*
  Shagbark hickory ..... *Carya ovata*
White birch ..... *Betula papyrifera*
Yellow birch ..... *Betula alleghaniensis*
Hard maple
  Black maple ..... *Acer nigrum*
  Sugar maple ..... *Acer saccharum*
Soft maple
  Red maple ..... *Acer rubrum*
  Silver maple ..... *Acer saccharinum*
American beech ..... *Fagus grandifolia*
Ash
  Black ash ..... *Fraxinus nigra*
  White ash ..... *Fraxinus americana*
  Green ash ..... *Fraxinus pennsylvanica*
Balsam poplar ..... *Populus balsamifera*
Aspen
  Bigtooth aspen ..... *Populus grandidentata*
  Quaking aspen ..... *Populus tremuloides*
Eastern cottonwood ..... *Populus deltoides*
American basswood ..... *Tilia americana*
Black walnut ..... *Juglans nigra*
Elm
  American elm ..... *Ulmus americana*
  Rock elm ..... *Ulmus thomasii*
  Slippery elm ..... *Ulmus rubra*

Other hardwoods
  Northern catalpa ..... *Catalpa speciosa*
  Black cherry ..... *Prunus serotina*
  River birch ..... *Betula nigra*
  Black locust ..... *Robinia pseudoacacia*
  Honeylocust ..... *Gleditsia triacanthos*
  Red mulberry ..... *Morus rubra*
  Butternut ..... *Juglans cineria*
  Black willow ..... *Salix nigra*
  Boxelder ..... *Acer negundo*
  Hackberry ..... *Celtis occidentalis*

TABLE TITLES

Table 1.—Number of active primary wood-using mills in Minnesota 1975, 1988, 1990, and 1992

Table 2.—Industrial roundwood receipts by type of mill in Minnesota, 1975, 1988, 1990, and 1992

Table 3.—Industrial roundwood production by Forest Survey Unit, species group, and type of product, Minnesota, 1992

Table 4.—Minnesota pulpwood production by species group, 1946-1992

Table 5.—Minnesota pulpwood production by species group and destination, 1992

Table 6.—Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Minnesota, 1992

Table 7.—Pulpwood receipts in Minnesota by species group, 1946-1992

Table 8.—Pulpwood receipts in Minnesota by area of origin, 1960-1992

Table 9.—Pulpwood receipts in Minnesota by species group and area of origin, 1992

Table 10.—Saw-log production and receipts in Minnesota by species group, 1990 and 1992

Table 11.—Saw-log production by Forest Survey Unit, species group, and State of destination, Minnesota, 1992

Table 12.—Saw-log production by Forest Survey Unit, county, and species group, Minnesota, 1992

Table 13.—Saw-log receipts in Minnesota by Forest Survey Unit, species group, and State of origin, 1992

Table 14.—Veneer log and bolt production and receipts in Minnesota for selected years, 1960-1992

Table 15.—Veneer log and bolt production and receipts by species group in Minnesota, 1990 and 1992

Table 16.—Veneer log and bolt production by species group and State or country of destination, Minnesota, 1992

Table 17.—Veneer log and bolt receipts in Minnesota by area of origin for selected years, 1960-1992

Table 18.—Veneer log and bolt receipts in Minnesota by species group and area of origin, 1992

Table 19.—Wood material harvested for industrial roundwood by Forest Survey Unit, source of material, and species group, Minnesota, 1992

Table 20.— Growing-stock removals from timberland for industrial roundwood by Forest Survey Unit, county, and species group, Minnesota, 1992

Table 21.— Sawtimber removals from timberland for industrial roundwood by Forest Survey Unit, county, and species group, Minnesota, 1992

Table 22.—Harvest residues generated by industrial roundwood harvesting by Forest Survey Unit, county, and species group, Minnesota, 1992

Table 23.—Residue produced at primary wood-using mills by type of material, type of use, and Forest Survey Unit, Minnesota, 1992

Table 1.--Number of active primary wood-using mills in Minnesota 1975, 1988, 1990, 1992

Kind of mill	1975	1988	1990	1992
Sawmills				
Large 1/	9	14	12	15
Medium 2/	29	57	52	43
Small 3/	583	602	457	510
Total	620	673	521	568
Pulp mills 4/	9	15	15	16
Veneer mills	4	4	1	1
Other mills	17	37	35	11
Total	650	729	572	596

1/ Annual lumber production in excess of 5 million board feet annually.

2/ Annual lumber production from 1 to 5 million board feet.

3/ Annual lumber production less than 1 million board feet.

4/ Includes particleboard and engineered lumber plants.

Table 2.--Industrial roundwood receipts by type of mill in Minnesota, 1975, 1988, 1990, 1992

(In million cubic feet)

Kind of mill	1975	1988	1990	1992	% change from 1990-1992
		SOFTWOODS			
Sawmills	9.7	22.4	14.8	27.6	86
Pulp mills 1/	28.8	33.3	41.1	33.9	-18
Other mills 2/	0.3	0.9	2.5	1.5	-40
Total	38.8	56.6	58.4	63.0	8
		HARDWOODS			
Sawmills	21.2	33.3	32.5	32.5	0
Pulp mills 1/	55.0	123.1	138.0	164.1	19
Other mills 2/	6.3	5.5	5.4	4.6	-15
Total	82.5	161.9	175.9	201.1	14
		ALL SPECIES			
Sawmills	30.9	55.7	47.3	60.1	27
Pulp mills 1/	83.8	156.4	179.1	198.0	11
Other mills 2/	6.6	6.4	7.9	6.0	-24
Total	121.3	218.5	234.3	264.1	13

1/ Includes paper, paperboard, particleboard, and engineered lumber mills.

2/ Does not include treating plants or residential fuelwood receipts.

Table 3.--Industrial roundwood production by Forest Survey Unit, species group, and type of product, Minnesota, 1992, 1/

ALL UNITS

Species group	Saw logs		Veneer logs		Pulpwood		Industrial fuelwood		Poles		Posts		Other products	All products
	MBF 2/	MCF 3/	MBF 2/	MCF 3/	Cords 4/	MCF 3/	Cords 4/	MCF 3/	Pieces	MCF 3/	M pieces	MCF 3/	MCF 3/	MCF 3/
SOFTWOODS														
Balsam fir	3,959	800	--	--	187,014	14,664	--	--	--	--	--	--	--	15,464
Redcedar	7	1	--	--	--	--	--	--	--	--	--	--	--	1
Tamarack	211	43	--	--	1,400	110	--	--	--	--	--	--	--	152
Spruce	5,582	1,128	--	--	146,299	11,472	--	--	--	--	--	--	--	12,599
Jack pine	57,293	11,573	--	--	109,259	8,576	--	--	3,281	20	332	266	413	20,847
Red pine	42,572	7,339	--	--	22,441	1,770	--	--	48,969	507	455	364	26	10,008
White pine	13,072	2,254	--	--	4,783	378	--	--	507	3	--	--	13	2,648
N. white-cedar	1,530	309	--	--	--	--	--	--	--	--	276	221	--	530
Total	124,226	23,447	--	--	471,197	36,969	--	--	52,757	531	1,064	851	453	62,250
HARDWOODS														
Soft maple	2,452	402	35	6	11,744	928	750	53	--	--	--	--	--	1,388
Hard maple	2,196	360	367	60	--	--	500	35	--	--	--	--	--	455
White birch	15,357	2,516	8,670	1,411	25,050	1,974	6,792	475	--	--	--	--	--	6,376
Yellow birch	39	6	51	8	--	--	--	--	--	--	--	--	--	15
Hickory	193	32	--	--	--	--	--	--	--	--	--	--	--	32
Hackberry	105	17	--	--	--	--	--	--	--	--	--	--	--	17
Ash	7,258	1,189	1,253	204	3,050	241	1,950	137	--	--	--	--	--	1,770
Black walnut	227	37	255	41	--	--	--	--	--	--	--	--	--	79
Cottonwood	6,252	1,024	462	75	--	--	--	--	--	--	--	--	--	1,099
Balsam poplar	1,523	250	--	--	85,478	6,736	--	--	--	--	--	--	--	6,985
Aspen	98,196	17,685	1,983	323	1,984,813	156,228	--	--	--	--	--	--	1,358	175,594
Black cherry	51	8	86	14	--	--	--	--	--	--	--	--	--	22
Red oak group	38,831	7,176	738	120	--	--	800	56	--	--	--	--	--	7,352
White oak group	9,713	1,795	427	70	--	--	300	21	--	--	--	--	172	2,058
Basswood	13,794	2,260	2,958	482	3,681	291	--	--	--	--	--	--	--	3,032
Elm	2,133	349	146	24	--	--	300	21	--	--	--	--	--	394
Other hardwoods	663	109	--	--	--	--	--	--	--	--	--	--	--	109
Total	198,986	35,214	17,432	2,838	2,113,817	166,397	11,392	797	--	--	--	--	1,530	206,777
All species	323,212	58,661	17,432	2,838	2,585,013	203,366	11,392	797	52,757	531	1,064	851	1,982	269,027

(Table 3 continued on next page)

(Table 3 continued)

ASPEN-BIRCH UNIT

Species group	Saw logs		Veneer logs		Pulpwood		Industrial fuelwood		Poles		Posts		Other products	All products
	MBF 2/	MCF 3/	MBF 2/	MCF 3/	Cords 4/	MCF 3/	Cords 4/	MCF 3/	Pieces	MCF 3/	M pieces	MCF 3/	MCF 3/	MCF 3/
SOFTWOODS														
Balsam fir	1,898	383	--	--	103,875	8,146	--	--	--	--	--	--	--	8,529
Tamarack	31	6	--	--	892	70	--	--	--	--	--	--	--	76
Spruce	4,680	945	--	--	115,326	9,043	--	--	--	--	--	--	--	9,989
Jack pine	13,509	2,729	--	--	40,773	3,202	--	--	--	--	182	146	--	6,077
Red pine	13,307	2,294	--	--	7,846	619	--	--	11,654	122	27	22	--	3,057
White pine	6,784	1,169	--	--	--	--	--	--	127	1	--	--	--	1,170
N. white-cedar	1,010	204	--	--	--	--	--	--	--	--	182	146	--	350
Total	41,219	7,731	--	--	268,711	21,080	--	--	11,781	123	392	313	--	29,248
HARDWOODS														
Soft maple	162	27	--	--	3,533	279	500	35	--	--	--	--	--	341
Hard maple	65	11	35	6	--	--	100	7	--	--	--	--	--	23
White birch	6,064	993	6,930	1,128	17,809	1,403	3,221	225	--	--	--	--	--	3,750
Yellow birch	5	1	4	1	--	--	--	--	--	--	--	--	--	1
Ash	928	152	89	14	931	74	850	60	--	--	--	--	--	299
Balsam poplar	176	29	--	--	54,922	4,328	--	--	--	--	--	--	--	4,357
Aspen	26,866	4,839	1,260	205	781,962	61,552	--	--	--	--	--	--	--	66,596
Red oak group	279	52	--	--	--	--	350	25	--	--	--	--	--	76
White oak group	11	2	--	--	--	--	--	--	--	--	--	--	--	2
Basswood	591	97	65	11	1,127	89	--	--	--	--	--	--	--	196
Elm	5	1	--	--	--	--	100	7	--	--	--	--	--	8
Total	35,152	6,202	8,383	1,365	860,285	67,725	5,121	358	--	--	--	--	--	75,650
All species	76,370	13,933	8,383	1,365	1,128,996	88,805	5,121	358	11,781	123	392	313	--	104,898

(Table 3 continued on next page)

(Table 3 continued)

CENTRAL HARDWOOD UNIT

Species group	Saw logs		Veneer logs		Pulpwood		Industrial fuelwood		Poles		Posts		Other products	All products
	MBF 2/	MCF 3/	MBF 2/	MCF 3/	Cords 4/	MCF 3/	Cords 4/	MCF 3/	Pieces	MCF 3/	M pieces	MCF 3/	MCF 3/	MCF 3/
SOFTWOODS														
Balsam fir	8	2	--	--	1,732	136	--	--	--	--	--	--	--	137
Redcedar	2	(4/)	--	--	--	--	--	--	--	--	--	--	--	--
Tamarack	47	10	--	--	--	--	--	--	--	--	--	--	--	10
Spruce	--	--	--	--	660	52	--	--	--	--	--	--	--	52
Jack pine	2,062	417	--	--	6,546	516	--	--	--	--	--	--	62	995
Red pine	4,022	693	--	--	8,229	649	--	--	300	2	--	--	--	1,345
White pine	716	123	--	--	4,783	378	--	--	--	--	--	--	--	501
Total	6,858	1,245	--	--	21,950	1,731	--	--	300	2	--	--	62	3,040
HARDWOODS														
Soft maple	1,199	196	16	3	2,135	169	--	--	--	--	--	--	--	368
Hard maple	1,556	255	221	36	--	--	--	--	--	--	--	--	--	291
White birch	1,074	176	442	72	928	73	521	36	--	--	--	--	--	357
Yellow birch	34	6	40	7	--	--	--	--	--	--	--	--	--	12
Hickory	193	32	--	--	--	--	--	--	--	--	--	--	--	32
Hackberry	105	17	--	--	--	--	--	--	--	--	--	--	--	17
Ash	2,232	366	300	49	521	41	--	--	--	--	--	--	--	456
Black walnut	139	23	195	32	--	--	--	--	--	--	--	--	--	54
Cottonwood	2,581	423	429	70	--	--	--	--	--	--	--	--	--	493
Balsam poplar	--	--	--	--	694	55	--	--	--	--	--	--	--	55
Aspen	4,263	768	108	18	109,643	8,635	--	--	--	--	--	--	782	10,202
Black cherry	46	8	86	14	--	--	--	--	--	--	--	--	--	22
Red oak group	27,530	5,087	605	98	--	--	--	--	--	--	--	--	--	5,186
White oak group	8,036	1,485	288	47	--	--	--	--	--	--	--	--	172	1,704
Basswood	5,639	924	1,184	193	622	49	--	--	--	--	--	--	--	1,165
Elm	1,597	262	14	2	--	--	--	--	--	--	--	--	--	264
Other hardwoods	548	90	--	--	--	--	--	--	--	--	--	--	--	90
Total	56,771	10,115	3,928	639	114,543	9,022	521	36	--	--	--	--	954	20,767
All species	63,629	11,360	3,928	639	136,493	10,753	521	36	300	2	--	--	1,016	23,807

(Table 3 continued on next page)

(Table 3 continued)

NORTHERN PINE UNIT

Species group	Saw logs		Veneer logs		Pulpwood		Industrial fuelwood		Poles		Posts		Other products	All products
	MBF 2/	MCF 3/	MBF 2/	MCF 3/	Cords 4/	MCF 3/	Cords 4/	MCF 3/	Pieces	MCF 3/	M pieces	MCF 3/	MCF 3/	MCF 3/
SOFTWOODS														
Balsam fir	2,054	415	--	--	81,407	6,382	--	--	--	--	--	--	--	6,797
Tamarack	117	24	--	--	508	40	--	--	--	--	--	--	--	64
Spruce	902	182	--	--	30,313	2,377	--	--	--	--	--	--	--	2,559
Jack pine	41,714	8,426	--	--	61,941	4,857	--	--	3,281	20	150	120	351	13,775
Red pine	25,226	4,349	--	--	6,234	491	--	--	37,015	384	428	343	26	5,593
White pine	5,571	960	--	--	--	--	--	--	380	3	--	--	13	976
N. white-cedar	520	105	--	--	--	--	--	--	--	--	94	75	--	180
Total	76,105	14,462	--	--	180,403	14,147	--	--	40,676	406	672	538	391	29,943
HARDWOODS														
Soft maple	545	89	9	2	6,076	480	250	18	--	--	--	--	--	588
Hard maple	332	54	70	11	--	--	400	28	--	--	--	--	--	94
White birch	8,208	1,344	1,298	211	6,312	497	3,050	214	--	--	--	--	--	2,267
Yellow birch	--	--	7	1	--	--	--	--	--	--	--	--	--	1
Ash	3,762	616	742	121	1,598	126	1,100	77	--	--	--	--	--	940
Black walnut	22	4	--	--	--	--	--	--	--	--	--	--	--	4
Cottonwood	326	53	--	--	--	--	--	--	--	--	--	--	--	53
Balsam poplar	1,346	220	--	--	29,833	2,351	--	--	--	--	--	--	--	2,571
Aspen	66,835	12,037	615	100	1,073,275	84,473	--	--	--	--	--	--	576	97,186
Black cherry	--	--	(5/)	(4/)	--	--	--	--	--	--	--	--	--	(4/)
Red oak group	10,132	1,872	87	14	--	--	450	32	--	--	--	--	--	1,918
White oak group	1,002	185	87	14	--	--	300	21	--	--	--	--	--	220
Basswood	6,697	1,097	1,529	249	1,932	153	--	--	--	--	--	--	--	1,499
Elm	125	20	5	1	--	--	200	14	--	--	--	--	--	35
Other hardwoods	2	(4/)	--	--	--	--	--	--	--	--	--	--	--	(4/)
Total	99,333	17,594	4,449	724	1,119,027	88,080	5,750	403	--	--	--	--	576	107,377
All species	175,438	32,056	4,449	724	1,299,430	102,227	5,750	403	40,676	406	672	538	967	137,320

(Table 3 continued on next page)

(Table 3 continued)

PRAIRIE UNIT

Species group	Saw logs		Veneer logs		Pulpwood		Industrial fuelwood		Poles		Posts		Other products	All products
	MBF 2/	MCF 3/	MBF 2/	MCF 3/	Cords 4/	MCF 3/	Cords 4/	MCF 3/	Pieces	MCF 3/	M pieces	MCF 3/	MCF 3/	MCF 3/
SOFTWOODS														
Redcedar	5	1	--	--	--	--	--	--	--	--	--	--	--	1
Tamarack	16	3	--	--	--	--	--	--	--	--	--	--	--	3
Jack pine	7	1	--	--	--	--	--	--	--	--	--	--	--	1
Red pine	16	3	--	--	132	10	--	--	--	--	--	--	--	13
White pine	1	(4/)	--	--	--	--	--	--	--	--	--	--	--	(4/)
Total	45	9	--	--	132	10	--	--	--	--	--	--	--	19
HARDWOODS														
Soft maple	547	90	10	2	--	--	--	--	--	--	--	--	--	91
Hard maple	243	40	41	7	--	--	--	--	--	--	--	--	--	47
White birch	11	2	--	--	--	--	--	--	--	--	--	--	--	2
Ash	337	55	121	20	--	--	--	--	--	--	--	--	--	75
Black walnut	67	11	59	10	--	--	--	--	--	--	--	--	--	21
Cottonwood	3,345	548	33	5	--	--	--	--	--	--	--	--	--	553
Balsam poplar	1	(4/)	--	--	29	2	--	--	--	--	--	--	--	2
Aspen	232	42	--	--	19,933	1,569	--	--	--	--	--	--	--	1,611
Black cherry	5	1	--	--	--	--	--	--	--	--	--	--	--	1
Red oak group	891	165	47	8	--	--	--	--	--	--	--	--	--	172
White oak group	664	123	53	9	--	--	--	--	--	--	--	--	--	131
Basswood	868	142	180	29	--	--	--	--	--	--	--	--	--	171
Elm	406	67	127	21	--	--	--	--	--	--	--	--	--	87
Other hardwoods	114	19	--	--	--	--	--	--	--	--	--	--	--	19
Total	7,730	1,303	672	109	19,962	1,571	--	--	--	--	--	--	--	2,983
All species	7,775	1,311	672	109	20,094	1,581	--	--	--	--	--	--	--	3,002

1/ Based on utilization studies in the region.

2/ Thousand board feet, International 1/4-inch rule.

3/ Thousand cubic feet.

4/ Less than 500 cubic feet.

5/ Less than 500 board feet.

Rows and columns may not sum due to rounding.

Table 4.--Minnesota pulpwood production by species group, 1946-1992

(In thousand standard cords, unpeeled) 1/

Year	Roundwood									Residue	
	Total	Pine	Balsam fir	Cedar	Spruce	Tamarack	Aspen	Birch	Other hardwoods	Soft-woods	Hard-woods
1946	977	333	93	--	258	19	265	1	--	3	5
1947	852	266	119	--	225	18	221	--	--	1	2
1948	988	286	150	--	269	5	276	2	--	--	--
1949	606	163	117	--	190	3	133	--	--	--	--
1950	748	187	126	--	185	1	248	--	1	--	--
1951	1,077	340	153	--	280	18	283	1	2	--	--
1952	937	194	163	--	293	13	270	2	2	--	--
1953	813	218	101	--	215	6	268	1	4	--	--
1954	837	214	118	--	237	7	254	1	6	--	--
1955	886	218	120	--	265	8	266	4	5	--	--
1956	1,067	259	140	--	287	14	353	5	9	--	--
1957	1,049	223	173	--	345	18	277	7	6	--	--
1958	903	198	116	--	241	14	324	2	8	--	--
1959	994	239	130	--	220	11	381	1	12	--	--
1960	1,048	225	145	--	256	19	392	1	10	--	--
1961	968	206	111	--	240	8	368	1	34	--	--
1962	979	201	110	--	217	9	406	2	34	--	--
1963	1,063	208	102	--	255	13	433	--	51	--	1
1964	1,063	204	90	--	256	12	451	--	45	--	5
1965	1,018	181	74	--	237	12	468	--	41	1	4
1966	1,174	256	80	--	172	7	612	1	31	2	13
1967	1,205	202	76	--	218	40	591	3	39	7	29
1968	1,087	203	43	--	157	26	583	1	22	16	36
1969	1,192	237	40	--	154	21	660	3	32	5	40
1970	1,224	221	45	--	181	36	600	31	27	17	66
1971	1,196	214	40	--	168	32	607	34	31	22	48
1972	1,354	216	66	--	192	31	689	42	30	25	63
1973	1,377	205	66	--	215	32	673	42	36	26	82
1974	1,578	239	92	--	207	43	804	44	37	35	77
1975	1,359	199	121	--	202	56	616	35	22	44	64
1976	1,309	172	74	--	176	37	673	46	32	33	66
1977	1,333	174	99	--	153	42	697	30	25	35	78
1978	1,338	186	96	--	164	31	704	9	39	35	74
1979 2/	1,458	158	117	--	153	36	838	7	31	43	75
1980	1,333	150	111	--	170	43	699	15	48	34	63
1981	1,370	147	101	--	127	30	801	11	53	39	61
1982	1,484	179	106	--	133	45	866	3	59	49	44
1983	1,910	140	90	--	95	26	1,392	4	69	55	39
1984	2,151	189	146	--	118	12	1,529	3	62	47	45
1985	1,880	137	122	--	111	9	1,361	2	48	47	43
1986	1,979	139	101	--	98	13	1,469	10	46	46	57
1987	2,078	111	112	--	101	8	1,578	13	41	54	60
1988	2,131	121	170	--	146	11	1,501	13	55	57	57
1989	2,264	132	198	--	163	5	1,610	23	54	29	50
1990	2,359	137	197	4	180	4	1,658	23	73	27	56
1991	2,393	163	197	--	141	4	1,698	14	90	30	56
1992	2,671	136	187	--	146	1	1,985	25	104	27	60

1/ 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

2/ Pulpwood includes logs, bolts, and wood residue used in manufacturing particleboard and waferboard after 1978.

Table 5.--Minnesota pulpwood production by species group and destination, 1992

(In thousand standard cords, unpeeled) 1/

Class of material and species group	Total	Minnesota	Wisconsin	Canada
ROUNDWOOD				
SOFTWOODS				
Balsam fir	187	184	--	3
Jack pine	109	95	6	8
Red pine	22	14	4	4
White pine	5	5	*(2/)*	--
Spruce	146	113	29	5
Tamarack	1	--	1	--
Total	471	410	40	21
HARDWOODS				
Ash	3	3	--	--
Aspen	1,985	1,917	43	25
Balsam poplar	85	85	--	--
Basswood	4	4	--	--
White birch	25	3	22	--
Soft maple	12	12	*(2/)*	--
Total	2,114	2,024	64	25
Total roundwood	2,585	2,434	104	46
RESIDUES 3/				
Softwood	27	26	1	1
Hardwood	60	60	--	--
Total	87	86	1	1
ALL MATERIAL	2,672	2,520	105	47

1/ 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

2/ Less than 500 cords.

3/ Chippable mill residues such as slabs, edgings, etc. Roundwood chips are included in roundwood.

Table 6.--Pulpwood production from roundwood by Forest Survey Unit, county and species group, Minnesota, 1992

(In standard cords, unpeeled)

Unit and county 1/	All species	Species group											
		Cedar	Balsam fir	Jack pine	Red pine	White pine	Spruce	Tama-rack	Ash	Aspen	Balsam poplar	Bass-wood	White birch	Soft maple
ASPEN-BIRCH														
Carlton	42,250	--	9,735	1,032	174	--	2,007	54	218	21,641	163	260	6,144	821
Cook	72,330	--	5,408	52	--	--	11,832	15	--	54,119	--	--	904	--
Koochiching	375,814	--	24,996	6,521	572	--	48,665	609	--	262,155	32,296	--	--	--
Lake	98,244	--	13,002	8,054	4,504	--	14,182	104	--	49,179	1,658	16	7,547	--
St. Louis	540,358	--	50,735	25,113	2,596	--	38,639	109	714	394,868	20,805	852	3,214	2,712
Total	1,128,996	--	103,875	40,773	7,846	--	115,326	892	931	781,962	54,922	1,127	17,809	3,533
NORTHERN PINE														
Aitkin	101,916	--	5,552	755	47	--	841	--	565	89,680	1,021	700	576	2,180
Becker	110,429	--	731	788	292	--	2	--	--	105,656	2,960	--	--	--
Beltrami	166,922	--	11,685	7,290	1,070	--	3,373	350	--	140,016	3,139	--	--	--
Cass	187,839	--	5,124	8,178	880	--	1,392	--	--	163,484	6,089	--	2,691	--
Clearwater	69,809	--	2,070	1,602	458	--	868	60	--	63,864	888	--	--	--
Crow Wing	72,859	--	545	3,217	961	--	38	--	--	68,018	--	--	80	--
Hubbard	96,629	--	491	3,211	822	--	213	--	--	89,505	2,368	--	20	--
Itasca	410,621	--	53,059	7,683	1,472	--	19,643	--	1,033	307,465	12,193	1,232	2,945	3,896
Lake of the Woods	40,204	--	2,126	15,661	58	--	2,803	98	--	18,943	514	--	--	--
Mahnomen	13,390	--	--	--	--	--	--	--	--	13,242	148	--	--	--
Roseau	20,759	--	24	12,931	29	--	1,142	--	--	6,119	514	--	--	--
Wadena	8,053	--	--	624	146	--	--	--	--	7,283	--	--	--	--
Total	1,299,430	--	81,407	61,941	6,234	--	30,313	508	1,598	1,073,275	29,833	1,932	6,312	6,076
CENTRAL HARDWOOD														
Benton	392	--	--	--	--	--	--	--	--	392	--	--	--	--
Chisago	8	--	--	--	--	--	--	--	--	8	--	--	--	--
Isanti	1,739	--	--	236	1,185	--	14	--	--	303	--	--	--	--
Kanabec	11,583	--	--	31	--	--	--	--	--	11,470	82	--	--	--
Mille Lacs	39,231	--	34	4,688	4,688	4,777	14	--	--	25,030	--	--	--	--
Morrison	9,280	--	--	--	--	--	22	--	--	9,259	--	--	--	--
Otter Tail	3,836	--	--	--	--	--	--	--	--	3,836	--	--	--	--
Pine	67,440	--	1,698	1,497	1,462	--	590	--	521	57,376	612	622	928	2,135
Sherburne	1,014	--	--	93	894	6	21	--	--	--	--	--	--	--
Stearns	293	--	--	--	--	--	--	--	--	293	--	--	--	--
Todd	1,677	--	--	--	--	--	--	--	--	1,677	--	--	--	--
Total	136,493	--	1,732	6,546	8,229	4,783	660	--	521	109,643	694	622	928	2,135
PRAIRIE														
Marshall	1,934	--	--	--	--	--	--	--	--	1,934	--	--	--	--
Norman	3,771	--	--	--	--	--	--	--	--	3,771	--	--	--	--
Pennington	4,395	--	--	--	--	--	--	--	--	4,395	--	--	--	--
Polk	5,007	--	--	--	--	--	--	--	--	5,007	--	--	--	--
Red Lake	4,855	--	--	--	--	--	--	--	--	4,825	29	--	--	--
Sibley	132	--	--	--	132	--	--	--	--	--	--	--	--	--
Total	20,094	--	--	--	132	--	--	--	--	19,933	29	--	--	--
State Total	2,585,013	--	187,014	109,259	22,441	4,783	146,299	1,400	3,050	1,984,813	85,478	3,681	25,050	11,744

1/ Includes only those counties that supplied pulpwood in 1992.

Table 7.--Pulpwood receipts in Minnesota by species group, 1946-1992

(In thousand standard cords, unpeeled) 1/

	Roundwood									Residue	
Year	Total	Pine	Balsam fir	Cedar	Spruce	Tamarack	Aspen	Birch	Other hardwoods	Soft-woods	Hard-woods
1946	599	175	62	--	141	6	207	--	--	3	5
1947	497	160	48	--	122	6	158	--	--	1	2
1948	726	187	77	--	195	3	264	--	--	--	--
1949	418	111	48	--	114	1	144	--	--	--	--
1950	595	177	41	--	108	1	267	--	1	--	--
1951	823	241	74	--	202	9	296	--	1	--	--
1952	720	154	62	--	191	9	302	--	2	--	--
1953	662	165	42	--	153	6	292	--	4	--	--
1954	687	163	52	--	171	6	289	--	6	--	--
1955	723	177	58	--	176	7	298	2	5	--	--
1956	835	204	69	--	176	9	365	3	9	--	--
1957	753	156	74	--	210	10	292	5	6	--	--
1958	699	161	55	--	133	3	338	2	7	--	--
1959	813	195	69	--	128	3	405	1	12	--	--
1960	787	164	85	--	116	3	408	1	10	--	--
1961	784	187	67	--	120	--	375	1	34	--	--
1962	828	189	75	--	111	--	418	1	34	--	--
1963	921	190	77	--	157	--	446	--	50	--	1
1964	938	213	68	--	153	--	455	--	43	--	6
1965	912	205	60	--	138	--	462	--	39	--	8
1966	1,063	207	60	--	155	--	588	1	31	--	21
1967	958	179	49	--	115	2	551	1	25	5	31
1968	993	206	33	--	92	--	576	--	27	13	46
1969	1,082	231	33	--	84	--	633	3	40	7	51
1970	1,058	188	42	--	111	--	557	31	33	22	74
1971	1,063	154	40	--	116	--	585	34	38	32	64
1972	1,224	166	65	--	128	4	686	41	36	23	75
1973	1,223	156	60	--	142	7	618	41	38	51	110
1974	1,392	193	84	--	142	10	718	37	40	73	95
1975	1,227	169	116	--	163	32	560	33	21	51	82
1976	1,177	134	68	--	142	7	599	43	31	62	91
1977	1,210	143	94	--	125	16	624	27	24	55	102
1978	1,218	151	90	--	136	10	647	3	31	60	90
1979 2/	1,294	130	109	--	131	18	733	3	28	66	76
1980	1,097	106	80	--	128	14	613	--	47	51	58
1981	1,164	116	71	--	95	5	725	1	52	37	62
1982	1,299	154	93	--	103	18	785	--	56	45	45
1983	1,782	137	87	--	78	8	1,313	1	69	48	41
1984	1,962	179	126	--	83	2	1,421	--	62	40	49
1985	1,775	135	106	--	77	7	1,320	--	49	39	42
1986	1,930	140	97	--	73	11	1,455	1	48	47	58
1987	2,029	107	108	--	75	8	1,578	1	43	52	57
1988	2,083	118	184	--	109	10	1,496	1	59	53	53
1989	2,201	119	206	--	124	4	1,595	--	55	52	46
1990	2,287	137	203	4	133	2	1,639	1	77	31	60
1991	2,380	164	197	--	141	4	1,698	--	90	30	56
1992	2,608	120	197	--	116	--	1,965	3	116	28	64

1/ 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

2/ Pulpwood includes logs, bolts, and wood residue used in manufacturing particleboard and waferboard after 1978.

Table 8.--Pulpwood receipts in Minnesota by area of origin, 1960-1992

(In thousand standard cords, unpeeled) 1/

Year	All areas	Area of origin				
		Michigan	Wisconsin	Minnesota	Other States	Canada
1960	702	--	19	626	--	57
1961	793	--	14	721	--	58
1962	786	--	15	711	--	60
1963	805	--	20	712	--	73
1964	835	--	19	753	--	63
1965	898	--	8	828	1	61
1966	1,140	1	13	970	77	79
1967	958	--	15	884	1	58
1968	992	--	22	900	1	69
1969	1,082	--	17	977	2	86
1970	1,058	--	11	981	1	65
1971	1,064	--	35	992	1	36
1972	1,224	--	28	1,168	2	26
1973	1,222	--	14	1,152	29	27
1974	1,392	--	14	1,297	16	65
1975	1,226	--	20	1,173	18	15
1976	1,177	--	23	1,109	26	19
1977	1,209	--	26	1,149	19	15
1978	1,218	--	26	1,155	20	17
1979 2/	1,295	--	21	1,226	29	19
1980	1,097	--	18	1,044	20	15
1981	1,164	--	34	1,119	--	11
1982	1,298	--	26	1,264	--	8
1983	1,782	--	53	1,720	--	9
1984	1,961	--	65	1,888	--	8
1985	1,775	--	59	1,714	--	2
1986	1,930	--	56	1,873	--	1
1987	2,029	--	62	1,967	--	--
1988	2,083	--	80	2,002	--	1
1989	2,201	2	89	2,110	--	--
1990	2,287	2	83	2,200	--	2
1991	2,373	5	69	2,269	--	30
1992	2,608	3	56	2,520	--	28

1/ 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

2/ Pulpwood includes logs, bolts, and wood residue used in manufacturing particleboard and waferboard after 1978.

Table 9.--Pulpwood receipts in Minnesota by species group and area of origin, 1992

(In thousand standard cords, unpeeled) 1/

Class of material and species group	Total	Michigan	Minnesota	Wisconsin	Canada
ROUNDWOOD					
SOFTWOODS					
Balsam fir	197	2	184	11	--
Jack pine	100	--	95	4	--
Red pine	15	--	14	1	--
White pine	5	--	5	--	--
Spruce	116	1	113	2	--
Total	433	3	410	18	--
HARDWOODS					
Ash	4	--	3	1	--
Aspen	1,965	--	1,917	25	23
Balsam poplar	91	--	85	--	5
Basswood	5	--	4	1	--
White birch	3	--	3	--	--
Soft maple	16	--	12	5	--
Total	2,084	--	2,024	32	28
All species	2,517	3	2,434	50	28
RESIDUES 2/					
Softwood	28	--	27	1	1
Hardwood	64	--	60	4	--
Total	92	--	87	5	1
ALL MATERIAL	2,608	3	2,520	56	28

1/ 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

2/ Chippable mill residues such as slabs, edgings, etc. Roundwood chips are included in roundwood.

Row and columns may not sum due to rounding.

Table 10.--Saw-log production and receipts in Minnesota by species group 1990 and 1992

(In thousand board feet) 1/

Species group	Production			Receipts		
	1990	1992	Change	1990	1992	Change
SOFTWOODS						
Cedar	1,856	1,537	-17%	1,819	1,589	-13%
Balsam fir	3,621	3,959	9%	3,517	3,856	10%
Jack pine	21,521	57,293	166%	21,612	64,747	200%
Red pine	33,344	42,572	28%	34,127	53,438	57%
White pine	14,456	13,072	-10%	15,296	15,976	4%
Spruce	5,299	5,582	5%	4,959	5,398	9%
Tamarack	263	211	-20%	263	211	-20%
Total	80,360	124,226	55%	81,593	145,215	78%
HARDWOODS						
Ash	7,608	7,258	-5%	7,508	7,129	-5%
Aspen	82,808	98,196	19%	82,855	100,579	21%
Balsam poplar	201	1,523	658%	201	1,601	697%
Basswood	14,718	13,794	-6%	13,125	12,161	-7%
White birch	16,929	15,357	-9%	16,931	15,347	-9%
Yellow birch	71	39	-45%	43	3	-93%
Cottonwood	3,339	6,252	87%	2,617	4,667	78%
Elm	3,118	2,133	-32%	3,114	1,929	-38%
Hickory	230	193	-16%	240	209	-13%
Hard maple	1,247	2,196	76%	941	1,747	86%
Soft maple	1,578	2,452	55%	1,077	1,836	70%
Red oak	42,107	38,831	-8%	38,474	31,135	-19%
White oak	9,338	9,713	4%	8,493	7,041	-17%
Walnut	863	227	-74%	396	223	-44%
Other hardwoods	101	819	711%	35	68	94%
Total	184,256	198,986	8%	176,050	185,675	5%
All species	264,616	323,212	22%	257,643	330,890	28%

1/ International 1/4-inch rule.

Table 11.--Saw-log production by Forest Survey Unit, species group, and State of destination, Minnesota, 1992

(In thousand board feet) 1/

Species group	ALL UNITS						
	Total	Iowa	Michigan	Minnesota	North Dakota	Wisconsin	Canada
SOFTWOODS							
Balsam fir	3,959	--	--	3,856	--	--	103
Redcedar	7	--	--	7	--	--	--
Tamarack	211	--	--	211	--	--	--
Spruce	5,582	--	--	5,233	--	--	349
Jack pine	57,293	--	--	56,455	--	--	837
Red pine	42,572	--	--	41,943	--	254	375
White pine	13,072	--	--	13,072	--	--	--
N. white-cedar	1,530	--	--	1,530	--	--	--
Total	124,226	--	--	122,307	--	254	1,666
HARDWOODS							
Soft maple	2,452	154	52	1,836	--	410	--
Hard maple	2,196	--	186	1,654	--	357	--
White birch	15,357	--	5	15,347	--	5	--
Yellow birch	39	--	16	3	--	19	--
Hickory	193	--	--	193	--	--	--
Hackberry	105	--	--	--	--	105	--
Ash	7,258	--	--	7,080	--	177	--
Black walnut	227	--	--	214	--	14	--
Cottonwood	6,252	1,074	--	4,667	300	211	--
Balsam poplar	1,523	--	--	1,523	--	--	--
Aspen	98,196	--	--	98,176	--	19	--
Black cherry	51	--	--	5	--	46	--
Red oak group	38,831	1,680	1	30,604	--	6,546	--
White oak group	9,713	1,059	--	6,663	--	1,992	--
Basswood	13,794	769	--	12,050	--	975	--
Elm	2,133	--	--	1,913	--	221	--
Other hardwoods	663	600	--	63	--	--	--
Total	198,986	5,337	260	181,990	300	11,098	--
All species	323,212	5,337	260	304,297	300	11,352	1,666

(Table 11 continued on next page)

(Table 11 contined)

ASPEN-BIRCH UNIT

Species group	Total	Iowa	Michigan	Minnesota	North Dakota	Wisconsin	Canada
SOFTWOODS							
Balsam fir	1,898	--	--	1,794	--	--	103
Tamarack	31	--	--	31	--	--	--
Spruce	4,680	--	--	4,331	--	--	349
Jack pine	13,509	--	--	12,672	--	--	837
Red pine	13,307	--	--	12,788	--	144	375
White pine	6,784	--	--	6,784	--	--	--
N. white-cedar	1,010	--	--	1,010	--	--	--
Total	41,219	--	--	39,409	--	144	1,666
HARDWOODS							
Soft maple	162	--	--	162	--	--	--
Hard maple	65	--	21	44	--	--	--
White birch	6,064	--	2	6,062	--	--	--
Yellow birch	5	--	2	3	--	--	--
Ash	928	--	--	928	--	--	--
Balsam poplar	176	--	--	176	--	--	--
Aspen	26,866	--	--	26,866	--	--	--
Red oak group	279	--	--	279	--	--	--
White oak group	11	--	--	11	--	--	--
Basswood	591	--	--	591	--	--	--
Elm	5	--	--	5	--	--	--
Total	35,152	--	24	35,127	--	--	--
All species	76,370	--	24	74,537	--	144	1,666

(Table 11 continued on next page)

(Table 11 contined)

CENTRAL HARDWOOD UNIT

Species group	Total	Iowa	Michigan	Minnesota	North Dakota	Wisconsin	Canada
SOFTWOODS							
Balsam fir	8	--	--	8	--	--	--
Redcedar	2	--	--	2	--	--	--
Tamarack	47	--	--	47	--	--	--
Jack pine	2,062	--	--	2,062	--	--	--
Red pine	4,022	--	--	3,912	--	110	--
White pine	716	--	--	716	--	--	--
Total	6,858	--	--	6,748	--	110	--
HARDWOODS							
Soft maple	1,199	102	23	663	--	410	--
Hard maple	1,556	--	98	1,101	--	357	--
White birch	1,074	--	--	1,069	--	5	--
Yellow birch	34	--	15	--	--	19	--
Hickory	193	--	--	193	--	--	--
Hackberry	105	--	--	--	--	105	--
Ash	2,232	--	--	2,054	--	177	--
Black walnut	139	--	--	125	--	14	--
Cottonwood	2,581	237	--	2,134	--	211	--
Aspen	4,263	--	--	4,243	--	19	--
Black cherry	46	--	--	--	--	46	--
Red oak group	27,530	1,680	1	19,303	--	6,546	--
White oak group	8,036	1,059	--	4,986	--	1,992	--
Basswood	5,639	704	--	3,959	--	975	--
Elm	1,597	--	--	1,377	--	221	--
Other hardwoods	548	503	--	45	--	--	--
Total	56,771	4,285	137	41,251	--	11,098	--
All species	63,629	4,285	137	47,999	--	11,208	--

(Table 11 continued on next page)

(Table 11 contined)

NORTHERN PINE UNIT

Species group	Total	Iowa	Michigan	Minnesota	North Dakota	Wisconsin	Canada
SOFTWOODS							
Balsam fir	2,054	--	--	2,054	--	--	--
Tamarack	117	--	--	117	--	--	--
Spruce	902	--	--	902	--	--	--
Jack pine	41,714	--	--	41,714	--	--	--
Red pine	25,226	--	--	25,226	--	--	--
White pine	5,571	--	--	5,571	--	--	--
N. white-cedar	520	--	--	520	--	--	--
Total	76,105	--	--	76,105	--	--	--
HARDWOODS							
Soft maple	545	--	14	531	--	--	--
Hard maple	332	--	42	290	--	--	--
White birch	8,208	--	3	8,204	--	--	--
Ash	3,762	--	--	3,762	--	--	--
Black walnut	22	--	--	22	--	--	--
Cottonwood	326	--	--	326	--	--	--
Balsam poplar	1,346	--	--	1,346	--	--	--
Aspen	66,835	--	--	66,835	--	--	--
Red oak group	10,132	--	(2/)	10,131	--	--	--
White oak group	1,002	--	--	1,002	--	--	--
Basswood	6,697	--	--	6,697	--	--	--
Elm	125	--	--	125	--	--	--
Other hardwoods	2	--	--	2	--	--	--
Total	99,333	--	59	99,274	--	--	--
All species	175,438	--	59	175,378	--	--	--

(Table 11 continued on next page)

(Table 11 contined)

PRAIRIE UNIT

Species group	Total	Iowa	Michigan	Minnesota	North Dakota	Wisconsin	Canada
SOFTWOODS							
Redcedar	5	--	--	5	--	--	--
Tamarack	16	--	--	16	--	--	--
Jack pine	7	--	--	7	--	--	--
Red pine	16	--	--	16	--	--	--
White pine	1	--	--	1	--	--	--
Total	45	--	--	45	--	--	--
HARDWOODS							
Soft maple	547	52	15	480	--	--	--
Hard maple	243	--	25	218	--	--	--
White birch	11	--	--	11	--	--	--
Ash	337	--	--	337	--	--	--
Black walnut	67	--	--	67	--	--	--
Cottonwood	3,345	838	--	2,207	300	--	--
Balsam poplar	1	--	--	1	--	--	--
Aspen	232	--	--	232	--	--	--
Black cherry	5	--	--	5	--	--	--
Red oak group	891	--	--	891	--	--	--
White oak group	664	--	--	664	--	--	--
Basswood	868	65	--	802	--	--	--
Elm	406	--	--	406	--	--	--
Other hardwoods	114	97	--	17	--	--	--
Total	7,730	1,052	40	6,338	300	--	--
All species	7,775	1,052	40	6,383	300	--	--

1/ International 1/4-inch rule.

2/ Less than 500 board feet.

Rows and columns may not sum due to rounding.

Table 12.--Saw-log production by Forest Survey Unit, county, and species group, Minnesota, 1992

(In thousand board feet) 1/

Unit and county	Balsam fir	Red-cedar	Tama-rack	Spruce	Jack pine	Red pine	White pine	N. white-cedar	Total soft-woods	Soft maple	Hard maple	White birch	Yellow birch	Hickory
ASPEN-BIRCH UNIT														
Carlton	2	--	5	9	842	909	151	--	1,918	162	62	465	--	--
Cook	531	--	--	2,655	1,001	388	350	86	5,012	--	--	1,095	--	--
Koochiching	836	--	1	180	1,735	1,615	574	623	5,562	--	3	488	--	--
Lake	42	--	--	521	1,196	1,723	1,380	32	4,894	--	--	2,272	--	--
St Louis	487	--	25	1,316	8,734	8,673	4,329	269	23,833	--	--	1,744	5	--
Total	1,898	--	31	4,680	13,509	13,307	6,784	1,010	41,219	162	65	6,064	5	--
CENTRAL HARDWOOD UNIT														
Anoka	--	--	--	--	--	6	5	--	11	--	--	--	--	--
Benton	--	--	--	--	--	326	2	--	328	--	--	--	--	--
Carver	--	--	--	--	--	--	--	--	--	27	--	--	--	--
Chisago	--	--	--	--	--	9	1	--	10	28	10	--	--	--
Dakota	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas	--	--	--	--	--	10	--	--	10	10	21	21	--	--
Fillmore	--	--	--	--	--	--	--	--	--	12	118	--	6	27
Goodhue	--	--	--	--	--	--	--	--	--	38	285	--	--	1
Hennepin	--	--	--	--	--	17	--	--	17	42	14	--	--	--
Houston	--	--	--	--	--	--	--	--	--	43	258	2	8	155
Isanti	--	--	--	--	--	1,014	92	--	1,106	--	1	--	--	--
Kanabec	--	--	--	--	--	9	20	--	29	33	31	--	--	--
Le Sueur	--	--	--	--	--	--	--	--	--	49	3	--	--	--
Mille Lacs	--	--	--	--	--	137	41	--	178	51	36	7	--	--
Morrison	--	--	4	--	730	1,036	10	--	1,780	5	7	6	--	--
Olmsted	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Otter Tail	--	--	12	--	32	55	58	--	157	5	40	95	--	--
Pine	8	--	4	--	1,248	1,230	416	--	2,906	176	307	867	--	--
Rice	--	2	--	--	--	--	--	--	2	37	161	--	--	--
Scott	--	--	--	--	--	--	--	--	--	53	--	--	--	--
Sherburne	--	--	--	--	12	109	35	--	155	--	--	--	--	--
Stearns	--	--	19	--	--	27	--	--	46	74	35	22	--	--
Todd	--	--	7	--	40	36	34	--	117	58	8	52	--	--
Wabasha	--	--	--	--	--	--	--	--	--	222	56	2	19	8
Washington	--	--	--	--	--	--	--	--	--	66	44	--	--	--
Winona	--	--	--	--	--	2	--	--	2	153	120	2	--	2
Wright	--	--	--	--	--	--	1	--	1	15	--	--	--	--
Total	8	2	47	--	2,062	4,022	716	--	6,858	1,199	1,556	1,074	34	193
NORTHERN PINE UNIT														
Aitkin	47	--	2	40	297	386	225	1	999	17	133	439	--	--
Becker	1	--	4	49	2,840	1,313	314	--	4,522	--	22	140	--	--
Beltrami	15	--	20	168	5,684	4,065	801	91	10,845	283	27	1,886	--	--
Cass	401	--	--	63	9,370	6,386	1,153	40	17,413	205	87	1,100	--	--
Clearwater	1	--	11	63	1,711	695	82	--	2,563	27	13	168	--	--
Crow Wing	17	--	6	--	4,055	1,729	204	--	6,011	12	10	170	--	--
Hubbard	1	--	6	116	8,980	3,181	342	1	12,629	--	10	388	--	--
Itasca	1,571	--	--	229	4,879	6,077	2,414	216	15,386	--	20	3,869	--	--
Lake of the Woods	--	--	29	44	1,209	284	--	161	1,727	--	--	31	--	--
Mahnomen	--	--	--	--	17	--	--	--	17	--	6	8	--	--
Roseau	--	--	38	87	1,045	336	--	10	1,516	--	--	2	--	--
Wadena	--	--	--	43	1,627	773	35	--	2,479	--	5	8	--	--
Total	2,054	--	117	902	41,714	25,226	5,571	520	76,105	545	332	8,208	--	--

(Table 12 continued on next page)

(Table 12 continued)

Unit and county	Balsam fir	Red-cedar	Tama-rack	Spruce	Jack pine	Red pine	White pine	N. white-cedar	Total soft-woods	Soft maple	Hard maple	White birch	Yellow birch	Hickory
PRAIRIE UNIT														
Blue Earth	--	--	--	--	--	--	--	--	--	44	2	--	--	--
Brown	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay	--	--	--	--	2	2	--	--	4	--	--	5	--	--
Dodge	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Faribault	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Freeborn	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Grant	--	--	--	--	--	1	--	--	1	--	--	--	--	--
Jackson	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Kandiyohi	--	--	--	--	--	--	--	--	--	8	2	2	--	--
Kittson	--	--	--	--	--	--	--	--	--	--	11	--	--	--
Lyon	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Marshall	--	--	8	--	4	--	--	--	12	--	--	1	--	--
Martin	--	--	--	--	--	--	--	--	--	--	32	--	--	--
McLeod	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Meeker	--	--	--	--	--	--	--	--	--	2	2	2	--	--
Mower	--	--	--	--	--	3	--	--	3	--	--	--	--	--
Murray	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nicollet	--	--	--	--	--	--	--	--	--	173	34	--	--	--
Nobles	--	--	--	--	--	--	--	--	--	4	--	--	--	--
Norman	--	--	--	--	--	--	--	--	--	18	--	--	--	--
Pipestone	--	--	--	--	--	8	--	--	8	--	--	--	--	--
Polk	--	5	8	--	1	2	1	--	17	--	--	1	--	--
Pope	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Red Lake	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	88	58	--	--	--
Renville	--	--	--	--	--	--	--	--	--	134	87	--	--	--
Sibley	--	--	--	--	--	--	--	--	--	75	14	--	--	--
Steele	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Stevens	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Swift	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Waseca	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Wilkin	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow Medicine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	5	16	--	7	16	1	--	45	547	243	11	--	--
STATE TOTAL	3,959	7	211	5,582	57,293	42,572	13,072	1,530	124,226	2,452	2,196	15,357	39	193

(Table 12 continued on next page)

(Table 12 continued)

Unit and county	Hack-berry	Ash	Black walnut	Cotton-wood	Balsam poplar	Aspen	Black cherry	Red oak group	White oak group	Bass-wood	Elm	Other hard-woods	Total hard-woods	All species
ASPEN-BIRCH UNIT														
Carlton	--	251	--	--	--	359	--	225	--	16	--	--	1,540	3,458
Cook	--	--	--	--	--	4,302	--	--	--	--	--	--	5,397	10,409
Koochiching	--	383	--	--	176	19,180	--	14	11	329	5	--	20,590	26,152
Lake	--	24	--	--	--	326	--	--	--	--	--	--	2,621	7,515
St Louis	--	270	--	--	--	2,698	--	40	--	246	--	--	5,003	28,837
Total	--	928	--	--	176	26,866	--	279	11	591	5	--	35,152	76,370
CENTRAL HARDWOOD UNIT														
Anoka	--	--	1	--	--	12	--	107	16	4	12	19	171	182
Benton	--	2	--	--	--	9	--	24	3	7	18	--	62	390
Carver	--	2	--	137	--	4	--	43	55	1	38	--	307	307
Chisago	--	15	--	--	--	17	--	139	57	84	2	--	352	363
Dakota	--	--	--	--	--	--	--	11	2	--	14	--	27	27
Douglas	--	149	10	21	--	32	--	402	109	215	25	--	1,014	1,024
Fillmore	--	79	27	4	--	28	--	2,442	904	487	252	57	4,443	4,443
Goodhue	--	65	21	17	--	39	--	1,367	457	454	13	--	2,758	2,758
Hennepin	--	24	3	207	--	29	--	61	47	23	38	--	489	506
Houston	57	52	6	154	--	44	14	6,697	1,778	862	342	38	10,510	10,510
Isanti	--	8	--	--	--	11	--	33	7	4	2	--	66	1,172
Kanabec	--	51	--	--	--	320	--	868	114	216	5	--	1,640	1,669
Le Sueur	--	--	--	105	--	--	--	48	5	93	7	--	310	310
Mille Lacs	--	151	--	--	--	794	--	797	162	355	26	--	2,379	2,557
Morrison	--	37	--	--	--	677	--	371	91	60	30	--	1,285	3,065
Olmsted	--	--	7	24	--	--	--	438	97	2	3	152	723	723
Otter Tail	--	329	--	30	--	337	--	1,407	414	671	62	--	3,388	3,546
Pine	--	399	--	--	--	1,680	--	1,039	211	486	19	--	5,185	8,091
Rice	--	55	6	164	--	2	--	587	207	202	123	--	1,544	1,546
Scott	--	43	--	373	--	5	--	79	113	--	58	--	724	724
Sherburne	--	--	--	--	--	1	--	41	1	--	1	--	44	199
Stearns	--	82	9	283	--	43	--	444	272	218	101	17	1,600	1,646
Todd	--	368	2	99	--	122	--	2,296	669	428	44	--	4,145	4,263
Wabasha	22	177	19	394	--	31	5	3,393	966	314	49	114	5,790	5,790
Washington	--	43	11	380	--	7	--	110	44	59	46	--	811	811
Winona	26	95	17	179	--	18	27	4,245	1,235	371	222	152	6,864	6,866
Wright	--	5	--	10	--	--	--	41	--	22	46	--	139	140
Total	105	2,232	139	2,581	--	4,263	46	27,530	8,036	5,639	1,597	548	56,771	63,629
NORTHERN PINE UNIT														
Aitkin	--	1,346	--	--	31	3,038	--	2,069	140	977	26	2	8,217	9,216
Becker	--	142	15	24	--	1,081	--	1,134	190	400	18	--	3,167	7,688
Beltrami	--	498	--	--	238	9,306	--	302	112	1,327	20	--	13,997	24,842
Cass	--	284	7	253	121	7,742	--	2,760	198	465	27	--	13,249	30,662
Clearwater	--	57	--	15	19	5,353	--	138	45	329	11	--	6,174	8,737
Crow Wing	--	137	--	--	--	2,776	--	2,335	164	83	--	--	5,688	11,699
Hubbard	--	24	--	--	124	2,097	--	221	30	98	1	--	2,993	15,622
Itasca	--	1,055	--	--	39	18,306	--	854	89	2,893	--	--	27,125	42,510
Lake of the Woods	--	143	--	--	625	12,423	--	3	--	1	5	--	13,232	14,959
Mahnomen	--	19	--	6	3	2,006	--	67	18	92	--	--	2,225	2,242
Roseau	--	4	--	13	146	2,141	--	--	--	--	17	--	2,323	3,839
Wadena	--	51	--	16	--	564	--	249	16	34	--	--	943	3,422
Total	--	3,762	22	326	1,346	66,835	--	10,132	1,002	6,697	125	2	99,333	175,438

(Table 12 continued on next page)

(Table 12 continued)

Unit and county	Hackberry	Ash	Black walnut	Cottonwood	Balsam poplar	Aspen	Black cherry	Red oak group	White oak group	Basswood	Elm	Other hardwoods	Total hardwoods	All species
PRAIRIE UNIT														
Blue Earth	--	2	4	95	--	--	--	45	10	90	7	--	300	300
Brown	--	4	--	28	--	--	--	--	3	4	--	--	40	40
Clay	--	8	--	178	--	7	--	13	2	3	65	--	281	285
Dodge	--	--	--	2	--	--	--	2	--	2	1	--	7	7
Faribault	--	--	8	94	--	--	--	1	--	--	6	--	109	109
Freeborn	--	--	--	149	--	--	--	10	--	--	4	--	163	163
Grant	--	4	--	1	--	--	--	10	--	6	2	--	24	25
Jackson	--	1	1	6	--	--	--	1	--	--	--	--	10	10
Kandiyohi	--	28	2	25	--	1	1	100	91	43	11	--	314	314
Kittson	--	--	--	--	--	--	--	--	--	--	--	97	108	108
Lyon	--	4	--	34	--	--	--	--	3	4	4	--	50	50
Marshall	--	1	--	5	--	13	--	--	--	--	4	--	24	36
Martin	--	32	--	--	--	130	--	32	32	65	--	--	324	324
McLeod	--	38	--	20	--	10	--	5	35	12	18	--	138	138
Meeker	--	21	2	38	--	10	4	60	80	51	19	--	293	293
Mower	--	--	--	6	--	--	--	27	30	--	4	--	67	70
Murray	--	--	--	67	--	--	--	--	--	--	10	--	77	77
Nicollet	--	28	7	581	--	--	--	190	43	307	29	17	1,408	1,408
Nobles	--	4	4	37	--	--	--	4	--	--	2	--	55	55
Norman	--	3	--	110	--	--	--	2	4	--	21	--	157	157
Pipestone	--	4	--	--	--	--	--	8	--	--	--	--	12	20
Polk	--	--	--	251	1	38	--	16	5	--	10	--	322	339
Pope	--	4	--	1	--	2	--	4	38	7	12	--	68	68
Red Lake	--	--	--	5	--	22	--	--	81	--	--	--	108	108
Redwood	--	61	14	539	--	--	--	123	63	84	51	--	1,081	1,081
Renville	--	84	21	758	--	--	--	184	83	120	77	--	1,547	1,547
Sibley	--	--	--	134	--	--	--	33	52	65	37	--	409	409
Steele	--	--	1	2	--	--	--	6	1	--	2	--	12	12
Stevens	--	1	--	4	--	--	--	1	--	--	4	--	10	10
Swift	--	--	--	--	--	--	--	--	2	--	1	--	3	3
Waseca	--	--	3	3	--	--	--	13	3	--	5	--	27	27
Wilkin	--	--	--	150	--	--	--	--	--	--	--	--	150	150
Yellow Medicine	--	3	--	23	--	--	--	--	3	3	--	--	32	32
Total	--	337	67	3,345	1	232	5	891	664	868	406	114	7,730	7,775
STATE TOTAL	105	7,258	227	6,252	1,523	98,196	51	38,831	9,713	13,794	2,133	663	198,986	323,212

1/ International 1/4-inch rule.

Table 13.--Saw-log receipts in Minnesota by Forest Survey Unit, species group, and State of origin, 1992

(In thousand board feet)

Species group	ALL UNITS					
	Total	Iowa	Michigan	Minnesota	Wisconsin	Canada
SOFTWOODS						
Balsam fir	3,856	--	--	3,856	--	--
Redcedar	7	--	--	7	--	--
Tamarack	211	--	--	211	--	--
Spruce	5,398	--	16	5,233	149	--
Jack pine	64,747	--	--	56,455	7,696	595
Red pine	53,438	--	105	41,943	11,390	--
White pine	15,976	--	144	13,072	2,760	--
N. white-cedar	1,582	--	--	1,530	--	52
Total	145,215	--	265	122,307	21,996	648
HARDWOODS						
Soft maple	1,836	--	--	1,836	--	--
Hard maple	1,747	60	--	1,654	32	--
White birch	15,347	--	--	15,347	--	--
Yellow birch	3	--	--	3	--	--
Hickory	209	16	--	193	--	--
Ash	7,129	16	--	7,080	--	32
Black walnut	223	10	--	214	--	--
Cottonwood	4,667	--	--	4,667	--	--
Balsam poplar	1,601	--	--	1,523	--	78
Aspen	100,579	16	108	98,176	34	2,245
Black cherry	5	--	--	5	--	--
Red oak group	31,135	509	--	30,604	23	--
White oak group	7,041	346	--	6,663	32	--
Basswood	12,161	111	--	12,050	--	--
Elm	1,929	16	--	1,913	--	--
Other hardwoods	63	--	--	63	--	--
Total	185,675	1,101	108	181,990	121	2,355
All species	330,890	1,101	373	304,297	22,117	3,003

(Table 13 continued on next page)

(Table 13 continued)

Species group	Total	Iowa	Michigan	Minnesota	Wisconsin	Canada
ASPEN-BIRCH UNIT						
SOFTWOODS						
Balsam fir	622	--	--	622	--	--
Tamarack	30	--	--	30	--	--
Spruce	3,333	--	16	3,284	32	--
Jack pine	3,109	--	--	3,093	16	--
Red pine	13,971	--	105	10,321	3,546	--
White pine	8,752	--	144	6,302	2,306	--
N. white-cedar	994	--	--	942	--	52
Total	30,811	--	265	24,594	5,901	52
HARDWOODS						
Soft maple	324	--	--	324	--	--
Hard maple	25	--	--	25	--	--
White birch	7,550	--	--	7,550	--	--
Yellow birch	3	--	--	3	--	--
Ash	890	--	--	890	--	--
Balsam poplar	162	--	--	162	--	--
Aspen	13,822	--	108	13,192	22	500
Red oak group	378	--	--	378	--	--
White oak group	2	--	--	2	--	--
Basswood	75	--	--	75	--	--
Total	23,231	--	108	22,602	22	500
All species	54,043	--	373	47,196	5,922	552
CENTRAL HARDWOOD UNIT						
SOFTWOODS						
Balsam fir	8	--	--	8	--	--
Redcedar	2	--	--	2	--	--
Tamarack	47	--	--	47	--	--
Jack pine	1,154	--	--	814	340	--
Red pine	1,618	--	--	1,278	340	--
White pine	1,217	--	--	763	454	--
Total	4,046	--	--	2,912	1,134	--
HARDWOODS						
Soft maple	561	--	--	561	--	--
Hard maple	1,174	60	--	1,081	32	--
White birch	960	--	--	960	--	--
Hickory	209	16	--	193	--	--
Ash	1,538	16	--	1,522	--	--
Black walnut	131	10	--	122	--	--
Cottonwood	1,395	--	--	1,395	--	--
Aspen	4,687	16	--	4,659	12	--
Red oak group	17,018	509	--	16,487	23	--
White oak group	5,162	346	--	4,784	32	--
Basswood	3,843	111	--	3,732	--	--
Elm	1,357	16	--	1,340	--	--
Other hardwoods	27	--	--	27	--	--
Total	38,064	1,101	--	36,864	99	--
All species	42,109	1,101	--	39,775	1,233	--

(Table 13 continued on next page)

(Table 13 continued)

Species group	Total	Iowa	Michigan	Minnesota	Wisconsin	Canada
NORTHERN PINE UNIT						
SOFTWOODS						
Balsam fir	3,226	--	--	3,226	--	--
Tamarack	89	--	--	89	--	--
Spruce	2,065	--	--	1,948	117	--
Jack pine	60,481	--	--	52,545	7,340	595
Red pine	37,841	--	--	30,336	7,505	--
White pine	6,007	--	--	6,007	--	--
N. white-cedar	588	--	--	588	--	--
Total	110,297	--	--	94,740	14,961	595
HARDWOODS						
Soft maple	452	--	--	452	--	--
Hard maple	258	--	--	258	--	--
White birch	6,829	--	--	6,829	--	--
Ash	4,258	--	--	4,225	--	32
Black walnut	1	--	--	1	--	--
Cottonwood	163	--	--	163	--	--
Balsam poplar	1,439	--	--	1,361	--	78
Aspen	81,964	--	--	80,219	--	1,745
Red oak group	12,584	--	--	12,584	--	--
White oak group	1,305	--	--	1,305	--	--
Basswood	7,121	--	--	7,121	--	--
Elm	136	--	--	136	--	--
Other hardwoods	3	--	--	3	--	--
Total	116,512	--	--	114,657	--	1,855
All species	226,809	--	--	209,397	14,961	2,451
PRAIRIE UNIT						
SOFTWOODS						
Redcedar	5	--	--	5	--	--
Tamarack	45	--	--	45	--	--
Jack pine	3	--	--	3	--	--
Red pine	8	--	--	8	--	--
Total	61	--	--	61	--	--
HARDWOODS						
Soft maple	498	--	--	498	--	--
Hard maple	290	--	--	290	--	--
White birch	8	--	--	8	--	--
Ash	443	--	--	443	--	--
Black walnut	91	--	--	91	--	--
Cottonwood	3,109	--	--	3,109	--	--
Aspen	106	--	--	106	--	--
Black cherry	5	--	--	5	--	--
Red oak group	1,155	--	--	1,155	--	--
White oak group	572	--	--	572	--	--
Basswood	1,122	--	--	1,122	--	--
Elm	437	--	--	437	--	--
Other hardwoods	33	--	--	33	--	--
Total	7,868	--	--	7,868	--	--
All species	7,929	--	--	7,929	--	--

1/ International 1/4-inch rule.

Table 14.--Veneer log and bolt production and receipts in Minnesota for selected years, 1960-1992

(In thousand board feet) 1/

Year	Production	Receipts
1960	10.2	1.1
1963	9.9	3.1
1965	8.5	1.1
1966	6.0	0.5
1968	5.2	0.5
1970	3.5	0.3
1972	4.2	0.4
1975	3.2	0.6
1980	6.5	3.5
1984	5.7	3.0
1988	16.2	11.6
1990	16.7	10.6
1992	17.4	10.7

1/ International 1/4-inch rule.

Table 15.--Veneer log and bolt production and receipts by species group in Minnesota, 1990 and 1992

(In thousand board feet) 1/

Species group	Production			Receipts		
	1990	1992	Change	1990	1992	Change
HARDWOOS						
Ash	1,230	1,253	23	--	--	--
Aspen	1,945	1,983	38	3,666	1,919	-1,747
Basswood	2,507	2,958	451	73	--	-73
White birch	8,646	8,670	24	7,800	8,654	854
Yellow birch	--	51	51	--	--	--
Cottonwood	240	462	222	5	--	-5
Elm	146	146	0	--	--	--
Hard maple	172	367	195	--	--	--
Soft maple	23	35	12	42	--	-42
Red oak	787	738	-49	--	83	83
White oak	659	427	-232	--	--	--
Walnut	309	255	-54	--	--	--
Other hardwoods	7	86	79	--	--	--
Total	16,671	17,431	760	11,586	10,656	-930

1/ International 1/4-inch rule.

Table 16.--Veneer log and bolt production by species group and State or country of destination, Minnesota, 1992

(In thousand board feet) 1/

Species group	Total	Destination				
		Michigan	Minnesota	Wisconsin	Ohio	Other foreign
ALL UNITS						
HARDWOODS						
Soft maple	35	35	--	*(2/)*	--	--
Hard maple	367	126	--	57	184	--
White birch	8,670	3	8,654	13	--	--
Yellow birch	51	11	--	40	--	--
Ash	1,253	--	--	73	1	1,179
Black walnut	255	--	--	--	40	215
Cottonwood	462	--	--	419	--	44
Aspen	1,983	--	1,919	52	--	11
Black cherry	86	--	--	0	86	--
Red oak group	738	1	83	364	--	289
White oak group	427	--	--	145	--	282
Basswood	2,958	--	--	1,041	--	1,917
Elm	146	--	--	--	--	146
Total	17,432	177	10,656	2,204	311	4,084
ASPEN-BIRCH UNIT						
Hard maple	35	14	--	--	21	--
White birch	6,930	2	6,925	3	--	--
Yellow birch	4	4	--	*(2/)*	--	--
Ash	89	--	--	1	*(2/)*	88
Aspen	1,260	--	1,245	9	--	6
Basswood	65	--	--	*(2/)*	--	65
Total	8,383	21	8,170	13	21	158

(Table 16 continued on next page)

(Table 16 contined)

Species group	Total	Destination				
		Michigan	Minnesota	Wisconsin	Ohio	Other foreign
CENTRAL HARDWOOD UNIT						
HARDWOODS						
Soft maple	16	16	--	*(2/)*	--	--
Hard maple	221	66	--	57	97	--
White birch	442	*(2/)*	432	10	--	--
Yellow birch	40	--	--	40	--	--
Ash	300	--	--	34	*(2/)*	266
Black walnut	195	--	--	--	31	165
Cottonwood	429	--	--	419	--	10
Aspen	108	--	96	11	--	--
Black cherry	86	--	--	*(2/)*	86	--
Red oak group	605	1	83	326	--	195
White oak group	288	--	--	114	--	173
Basswood	1,184	--	--	800	--	384
Elm	14	--	--	--	--	14
Total	3,928	83	612	1,812	214	1,207
NORTHERN PINE UNIT						
Soft maple	9	9	--	*(2/)*	--	--
Hard maple	70	29	--	--	42	--
White birch	1,298	*(2/)*	1,297	1	--	--
Yellow birch	7	7	--	--	--	--
Ash	742	--	--	37	1	704
Aspen	615	--	578	31	--	5
Black cherry	*(2/)*	--	--	*(2/)*	--	--
Red oak group	87	*(2/)*	--	39	--	48
White oak group	87	--	--	30	--	56
Basswood	1,529	--	--	241	--	1,288
Elm	5	--	--	--	--	5
Total	4,449	46	1,875	379	43	2,107
PRAIRIE UNIT						
Soft maple	10	10	--	--	--	--
Hard maple	41	17	--	--	25	--
Ash	121	--	--	--	*(2/)*	121
Black walnut	59	--	--	--	9	50
Cottonwood	33	--	--	--	--	33
Red oak group	47	*(2/)*	--	--	--	47
White oak group	53	--	--	--	--	53
Basswood	180	--	--	--	--	180
Elm	127	--	--	--	--	127
Total	672	27	--	--	34	611

1/ International 1/4-inch rule.

2/ Less than 500 board feet.

Table 17.--Veneer log and bolt receipts in Minnesota by area of origin for selected years, 1960- 1992

(In million board feet) 1/

Year	All areas	Area of origin	
		Minnesota	Canada 2/
1960	1.1	1.1	--
1963	3.1	3.0	0.1
1965	1.1	1.1	--
1966	0.5	0.5	--
1968	0.5	0.5	--
1970	0.3	0.3	--
1972	0.4	0.4	--
1975	0.6	0.6	--
1980	3.5	3.5	--
1984	3.0	3.0	--
1988	11.6	11.6	--
1990	10.6	10.6	--
1992	10.7	10.7	--

1/ International 1/4-inch rule.

2/ Includes only logs and bolts shipped to Canadian mills for processing.

Table 18.--Veneer log and bolt receipts in Minnesota by species group and area of origin, 1992

(In thousand board feet) 1/

Species group	Total	Minnesota
White birch	8,654	8,654
Aspen	1,919	1,919
Red oak group	83	83
Total	10,656	10,656

1/ International 1/4-inch rule.

Table 19.--Wood material harvested for industrial roundwood by Forest Survey Unit, source of material, and species group, Minnesota, 1992 1/

(In thousand cubic feet)

ALL UNITS

Species group	Growing stock				Non-growing stock						Total material used for products	Total material not used	Total material harvested
	Used for products		Logging residue		Used for products				Logging slash				
	Saw-timber	Pole-timber	(Not used)	Total	Limb-wood	Sap-lings	Cull trees	Dead trees	(Not used)	Total			
SOFTWOODS													
Balsam fir	9,863.7	4,983.5	361.4	15,208.5	586.7	--	8.7	21.0	6,356.1	6,972.5	15,463.6	6,717.5	22,181.0
Redcedar	1.2	0.1	0.1	1.5	--	--	--	--	0.7	0.8	1.4	0.8	2.2
Tamarack	106.1	40.7	5.8	152.7	4.4	--	0.5	0.7	66.7	72.3	152.5	72.6	225.0
Spruce	8,161.0	3,927.4	324.2	12,412.6	473.0	--	12.3	25.6	5,208.6	5,719.5	12,599.2	5,532.9	18,132.1
Jack pine	15,917.1	3,813.8	1,194.1	20,925.0	714.9	8.6	159.6	233.3	8,819.4	9,935.8	20,847.3	10,013.5	30,860.8
Red pine	8,938.3	579.6	331.9	9,849.9	286.2	11.8	127.5	64.6	3,315.3	3,805.3	10,008.0	3,647.2	13,655.2
White pine	2,479.9	25.0	66.2	2,571.1	117.6	--	13.1	12.4	873.4	1,016.5	2,648.0	939.6	3,587.6
N. white-cedar	313.8	162.4	29.9	506.1	3.8	7.2	31.0	11.8	154.9	208.6	530.0	184.8	714.7
Total	45,781.2	13,532.5	2,313.7	61,627.4	2,186.6	27.7	352.7	369.3	24,795.1	27,731.4	62,250.0	27,108.8	89,358.7
HARDWOODS													
Soft maple	517.3	650.1	92.9	1,260.2	132.2	39.3	36.2	12.7	186.9	407.2	1,387.7	279.7	1,667.4
Hard maple	378.7	42.1	91.8	512.6	13.3	0.1	20.3	--	174.0	207.8	454.5	265.8	720.3
White birch	4,352.2	1,450.4	879.0	6,681.6	220.0	1.4	352.4	--	2,316.8	2,890.5	6,376.3	3,195.8	9,572.2
Yellow birch	13.1	0.5	2.8	16.5	0.1	--	1.0	--	4.9	6.0	14.7	7.8	22.5
Hickory	27.9	2.6	7.2	37.7	0.2	--	1.0	--	14.0	15.1	31.6	21.1	52.8
Hackberry	15.1	1.4	3.9	20.4	0.1	--	0.5	--	7.6	8.2	17.2	11.5	28.6
Ash	1,298.6	302.6	304.3	1,905.5	80.4	10.8	74.4	3.4	576.7	745.7	1,770.2	881.0	2,651.2
Black walnut	70.1	3.0	15.4	88.6	0.3	--	5.2	--	27.0	32.5	78.7	42.4	121.1
Cottonwood	970.6	83.8	245.3	1,299.6	6.4	--	38.6	--	471.2	516.2	1,099.4	716.5	1,815.9
Balsam poplar	2,810.0	3,678.9	296.0	6,784.8	181.0	--	315.3	--	2,999.3	3,495.7	6,985.2	3,295.3	10,280.5
Aspen	120,086.3	47,713.7	9,728.9	177,528.8	2,356.6	86.5	5,280.4	70.7	67,786.9	75,581.0	175,594.1	77,515.7	253,109.8
Black cherry	20.1	0.7	4.3	25.1	0.1	--	1.6	--	7.3	9.0	22.5	11.6	34.1
Red oak group	4,970.5	55.3	1,573.5	6,599.2	146.0	0.2	2,149.2	31.1	4,760.3	7,086.6	7,352.1	6,333.7	13,685.8
White oak group	1,429.5	16.4	422.2	1,868.0	48.4	0.1	555.8	7.8	1,232.0	1,844.0	2,057.8	1,654.2	3,712.0
Basswood	2,470.8	372.6	594.3	3,437.7	50.4	12.4	121.6	4.0	1,121.5	1,309.9	3,031.9	1,715.8	4,747.6
Elm	334.1	36.2	83.4	453.7	8.8	0.1	15.1	--	160.3	184.2	394.3	243.7	638.0
Other hardwoods	95.8	8.9	24.7	129.3	0.7	--	3.3	--	47.9	51.9	108.6	72.6	181.2
Total	139,860.7	54,419.1	14,369.7	208,649.5	3,244.9	150.6	8,971.9	129.6	81,894.7	94,391.6	206,776.8	96,264.4	303,041.1
All species	185,641.9	67,951.6	16,683.4	270,276.9	5,431.5	178.2	9,324.6	498.9	106,689.8	122,123.0	269,026.7	123,373.1	392,399.9

(Table 19 continued on next page)

(Table 19 continued)

ASPEN-BIRCH UNIT

Species group	Growing stock				Non-growing stock						Total material used for products	Total material not used	Total material harvested
	Used for products		Logging residue		Used for products				Logging slash				
	Saw-timber	Pole-timber	(Not used)	Total	Limb-wood	Sap-lings	Cull trees	Dead trees	(Not used)	Total			
SOFTWOODS													
Balsam fir	5,430.8	2,730.9	193.3	8,355.0	348.8	--	4.2	14.4	3,453.7	3,821.1	8,529.0	3,647.1	12,176.1
Tamarack	49.1	24.3	2.0	75.4	2.6	--	0.1	0.1	32.0	34.8	76.2	34.0	110.2
Spruce	6,485.6	3,086.1	259.3	9,831.1	384.0	--	10.3	22.7	4,113.8	4,530.8	9,988.7	4,373.1	14,361.9
Jack pine	4,465.3	1,189.7	283.0	5,938.0	297.7	4.7	48.0	71.3	2,395.8	2,817.5	6,076.7	2,678.8	8,755.5
Red pine	2,783.1	104.7	93.5	2,981.3	123.4	0.7	25.3	19.9	998.0	1,167.3	3,057.1	1,091.4	4,148.6
White pine	1,150.6	0.0	33.3	1,183.9	12.9	--	6.8	--	452.8	472.5	1,170.3	486.1	1,656.4
N. white-cedar	207.1	107.2	19.7	334.1	2.5	4.7	20.5	7.8	102.2	137.7	349.8	121.9	471.8
Total	20,571.7	7,242.9	884.1	28,698.7	1,172.0	10.2	115.0	136.1	11,548.3	12,981.6	29,247.9	12,432.4	41,680.3
HARDWOODS													
Soft maple	74.2	195.3	6.1	275.6	45.6	12.0	9.7	3.9	12.4	83.6	340.7	18.5	359.2
Hard maple	16.0	3.4	3.4	22.8	2.3	--	1.6	--	6.1	10.0	23.3	9.5	32.8
White birch	2,480.8	925.3	465.3	3,871.5	116.4	0.6	227.2	--	1,328.0	1,672.2	3,750.4	1,793.3	5,543.7
Yellow birch	1.3	0.1	0.3	1.7	--	--	0.1	--	0.5	0.6	1.5	0.8	2.3
Ash	171.3	81.6	36.9	289.9	28.8	3.3	13.4	1.0	70.8	117.3	299.5	107.7	407.2
Balsam poplar	1,689.6	2,353.0	160.3	4,202.9	115.5	--	198.6	--	1,869.1	2,183.2	4,356.7	2,029.4	6,386.1
Aspen	45,271.8	18,200.8	3,489.0	66,961.5	985.9	42.2	2,060.5	34.5	25,460.0	28,583.0	66,595.6	28,948.9	95,544.6
Red oak group	40.3	9.1	11.2	60.6	8.6	0.1	17.8	0.2	34.0	60.7	76.1	45.2	121.3
White oak group	1.3	0.0	0.4	1.8	--	--	0.6	--	1.3	1.9	2.0	1.7	3.7
Basswood	108.7	65.4	23.8	197.9	11.5	3.8	5.7	1.2	45.9	68.2	196.3	69.7	266.1
Elm	2.3	2.6	0.2	5.1	2.2	--	0.7	--	0.4	3.3	7.8	0.5	8.4
Total	49,857.7	21,836.6	4,196.9	75,891.2	1,316.9	62.1	2,535.7	40.9	28,828.5	32,784.1	75,649.9	33,025.4	108,675.3
All species	70,429.4	29,079.5	5,081.0	104,589.9	2,488.9	72.3	2,650.8	177.0	40,376.8	45,765.8	104,897.8	45,457.8	150,355.7

(Table 19 continued on next page)

(Table 19 continued)

CENTRAL HARDWOOD UNIT

Species group	Growing stock				Non-growing stock						Total material used for products	Total material not used	Total material harvested
	Used for products		Logging residue		Used for products				Logging slash				
	Saw-timber	Pole-timber	(Not used)	Total	Limb-wood	Sap-lings	Cull trees	Dead trees	(Not used)	Total			
SOFTWOODS													
Balsam fir	86.1	46.4	2.9	135.4	4.9	--	--	--	56.9	61.9	137.4	59.8	197.3
Redcedar	0.4	--	--	0.4	--	--	--	--	0.2	0.2	0.4	0.2	0.6
Tamarack	8.4	0.7	0.8	9.9	0.1	--	0.1	0.2	4.8	5.1	9.5	5.6	15.1
Spruce	32.3	17.6	1.1	50.9	1.8	--	--	--	21.4	23.2	51.7	22.4	74.1
Jack pine	743.7	115.5	46.6	905.8	110.7	--	4.5	20.3	250.6	386.1	994.6	297.3	1,291.9
Red pine	1,120.7	85.8	25.3	1,231.7	104.3	--	14.0	20.0	380.2	518.4	1,344.7	405.5	1,750.1
White pine	374.9	19.2	3.5	397.7	94.0	--	0.7	12.4	48.0	155.2	501.3	51.5	552.8
Total	2,366.4	285.3	80.2	2,731.9	315.8	--	19.4	52.8	762.1	1,150.1	3,039.7	842.3	3,882.0
HARDWOODS													
Soft maple	204.4	123.7	45.5	373.6	20.8	6.7	9.8	2.2	93.1	132.6	367.6	138.6	506.2
Hard maple	257.1	20.9	63.9	341.8	1.6	--	11.3	--	121.7	134.6	290.8	185.6	476.4
White birch	256.0	67.3	54.7	378.0	14.6	0.1	19.4	--	127.4	161.5	357.5	182.0	539.5
Yellow birch	10.8	0.5	2.4	13.6	--	--	0.8	--	4.1	5.0	12.1	6.5	18.6
Hickory	27.9	2.6	7.2	37.7	0.2	--	1.0	--	14.0	15.1	31.6	21.1	52.8
Hackberry	15.1	1.4	3.9	20.4	0.1	--	0.5	--	7.6	8.2	17.2	11.5	28.6
Ash	372.5	56.5	91.2	520.3	7.4	1.8	16.7	0.6	173.8	200.3	455.5	265.0	720.6
Black walnut	48.6	1.9	10.5	61.0	0.2	--	3.8	--	18.1	22.1	54.5	28.6	83.1
Cottonwood	435.6	34.6	107.8	578.0	2.7	--	19.7	--	204.4	226.9	492.6	312.2	804.8
Balsam poplar	21.0	29.7	1.9	52.7	1.5	--	2.5	--	23.5	27.4	54.7	25.4	80.1
Aspen	6,579.3	3,023.6	653.2	10,256.1	285.3	21.5	274.5	17.6	3,170.2	3,769.1	10,201.9	3,823.4	14,025.3
Black cherry	19.4	0.6	4.1	24.1	0.1	--	1.6	--	6.9	8.6	21.7	11.0	32.7
Red oak group	3,527.1	24.8	1,117.8	4,669.6	91.0	--	1,521.0	22.0	3,378.2	5,012.2	5,185.9	4,496.0	9,681.9
White oak group	1,194.9	7.2	351.3	1,553.5	36.2	--	459.4	6.4	1,022.0	1,524.0	1,704.2	1,373.3	3,077.5
Basswood	995.3	107.3	242.2	1,344.8	12.1	2.1	47.9	0.7	456.8	519.6	1,165.4	699.0	1,864.4
Elm	232.8	21.4	59.8	314.0	1.6	--	8.2	--	116.1	125.9	264.0	175.9	439.9
Other hardwoods	79.1	7.3	20.4	106.8	0.5	--	2.7	--	39.6	42.9	89.7	60.0	149.6
Total	14,276.9	3,531.4	2,837.7	20,646.0	476.0	32.2	2,400.8	49.5	8,977.4	11,936.0	20,766.9	11,815.1	32,582.0
All species	16,643.3	3,816.6	2,918.0	23,377.9	791.8	32.2	2,420.2	102.3	9,739.4	13,086.0	23,806.6	12,657.4	36,464.0

(Table 19 continued on next page)

(Table 19 continued)

NORTHERN PINE UNIT

Species group	Growing stock				Non-growing stock						Total material used for products	Total material not used	Total material harvested
	Used for products		Logging residue		Used for products				Logging slash				
	Saw-timber	Pole-timber	(Not used)	**Total**	Limb-wood	Sap-lings	Cull trees	Dead trees	(Not used)	**Total**			
SOFTWOODS													
Balsam fir	4,346.7	2,206.2	165.2	6,718.1	233.1	--	4.5	6.6	2,845.4	3,089.6	6,797.1	3,010.6	9,807.7
Tamarack	45.8	15.4	2.8	64.0	1.7	--	0.3	0.4	28.3	30.7	63.5	31.1	94.7
Spruce	1,643.1	823.7	63.8	2,530.6	87.1	--	2.0	2.9	1,073.4	1,165.4	2,558.8	1,137.3	3,696.1
Jack pine	10,706.9	2,508.5	864.4	14,079.7	306.4	3.9	107.1	141.7	6,172.3	6,731.5	13,774.5	7,036.7	20,811.2
Red pine	5,024.8	386.6	212.9	5,624.3	58.2	11.1	87.9	24.4	1,931.8	2,113.5	5,593.0	2,144.8	7,737.8
White pine	954.2	5.8	29.4	989.4	10.6	--	5.6	--	372.6	388.8	976.2	402.0	1,378.2
N. white-cedar	106.7	55.2	10.2	172.0	1.3	2.4	10.5	4.0	52.7	70.9	180.1	62.8	243.0
Total	22,828.2	6,001.4	1,348.6	30,178.2	698.5	17.5	217.8	180.0	12,476.6	13,590.4	29,943.3	13,825.2	43,768.6
HARDWOODS													
Soft maple	158.3	323.7	20.7	502.7	65.2	20.5	13.8	6.6	41.4	147.6	588.2	62.1	650.3
Hard maple	64.5	14.6	14.3	93.4	9.2	0.1	5.6	--	26.9	41.8	93.9	41.2	135.1
White birch	1,613.7	457.6	358.6	2,429.9	89.0	0.6	105.7	--	860.6	1,056.0	2,266.6	1,219.2	3,485 8
Yellow birch	1.0	--	0.2	1.2	--	--	0.1	--	0.3	0.4	1.1	0.5	1.6
Ash	688.3	160.0	160.3	1,008.6	43.8	5.7	40.7	1.8	302.8	394.7	940.2	463.1	1,403 3
Black walnut	3.2	0.3	0.8	4.3	--	--	0.1	--	1.6	1.7	3.6	2.4	6.0
Cottonwood	47.1	4.4	12.1	63.6	0.3	--	1.6	--	23.6	25.6	53.5	35.7	89.2
Balsam poplar	1,098.3	1,294.9	133.6	2,526.8	64.0	--	114.1	--	1,105.7	1,283.8	2,571.3	1,239.3	3,810.6
Aspen	67,117.1	26,063.4	5,501.5	98,681.9	1,071.1	22.7	2,893.3	18.6	38,518.4	42,524.1	97,186.1	44,019.9	141,206.0
Red oak group	1,285.0	20.5	407.6	1,713.2	43.4	0.1	560.7	8.1	1,237.6	1,849.9	1,917.9	1,645.2	3,563.1
White oak group	142.5	8.5	42.5	193.4	9.9	0.1	58.5	0.8	125.6	194.9	220.3	168.1	388.4
Basswood	1,215.1	188.3	291.1	1,694.5	25.9	6.5	60.8	2.1	548.5	643.8	1,498.6	839.6	2,338.3
Elm	21.8	6.8	4.8	33.4	4.5	--	2.1	--	9.2	15.9	35.3	14.0	49.3
Other hardwoods	0.3	--	0.1	0.4	--	--	0.0	--	0.1	0.2	0.3	0.2	0.5
Total	73,456.2	28,543.0	6,948.0	108,947.2	1,426.3	56.3	3,857.2	38.0	42,802.5	48,180.3	107,376.9	49,750.6	157,127.5
All species	96,284.4	34,544.4	8,296.7	139,125.4	2,124.8	73.7	4,075.1	218.0	55,279.1	61,770.7	137,320.3	63,575.8	200,896.1

(Table 19 continued on next page)

(Table 19 continued)

PRAIRIE UNIT

Species group	Growing stock				Non-growing stock						Total material used for products	Total material not used	Total material harvested
	Used for products		Logging residue		Used for products				Logging slash				
	Saw-timber	Pole-timber	(Not used)	**Total**	Limb-wood	Sap-lings	Cull trees	Dead trees	(Not used)	**Total**			
Redcedar	0.9	0.1	0.1	1.1	--	--	--	--	0.5	0.5	1.0	0.6	1.6
Tamarack	2.9	0.3	0.3	3.4	--	--	--	0.1	1.6	1.7	3.2	1.9	5.1
Jack pine	1.2	0.1	0.1	1.5	--	--	--	--	0.7	0.8	1.4	0.8	2.2
Red pine	9.8	2.5	0.3	12.5	0.2	--	0.4	0.3	5.2	6.2	13.2	5.5	18.7
White pine	0.2	--	--	0.2	--	--	--	--	0.1	0.1	0.2	0.1	0.2
Total	14.9	2.9	0.8	18.6	0.3	--	0.4	0.4	8.1	9.3	19.0	8.9	27.9
HARDWOODS													
Soft maple	80.4	7.3	20.6	108.4	0.5	--	2.9	--	39.9	43.4	91.2	60.6	151.8
Hard maple	41.1	3.3	10.2	54.6	0.3	--	1.9	--	19.3	21.4	46.5	29.4	76.0
White birch	1.6	0.2	0.4	2.2	--	--	0.1	--	0.8	0.9	1.9	1.2	3.1
Ash	66.4	4.5	15.9	86.8	0.4	--	3.6	--	29.4	33.4	74.9	45.2	120.1
Black walnut	18.3	0.9	4.1	23.3	0.1	--	1.3	--	7.3	8.6	20.6	11.4	32.0
Cottonwood	487.9	44.8	125.3	658.0	3.4	--	17.3	--	243.2	263.8	553.3	368.5	921.8
Balsam poplar	1.0	1.3	0.1	2.4	0.1	--	0.1	--	1.1	1.2	2.5	1.2	3.7
Aspen	1,118.1	425.9	85.2	1,629.2	14.3	--	52.2	--	638.3	704.8	1,610.5	723.5	2,334.0
Black cherry	0.7	0.1	0.2	1.0	--	--	--	--	0.4	0.4	0.8	0.5	1.4
Red oak group	118.1	0.8	36.9	155.8	3.0	--	49.6	0.7	110.4	163.7	172.2	147.3	319.5
White oak group	90.7	0.6	28.0	119.4	2.2	--	37.3	0.5	83.1	123.2	131.4	111.2	242.5
Basswood	151.7	11.6	37.2	200.6	0.9	--	7.2	--	70.2	78.3	171.5	107.4	278.9
Elm	77.3	5.4	18.6	101.3	0.4	--	4.1	--	34.6	39.1	87.2	53.2	140.4
Other hardwoods	16.4	1.5	4.2	22.1	0.1	--	0.6	--	8.2	8.9	18.6	12.4	31.0
Total	2,269.9	508.1	387.0	3,165.0	25.7	--	178.1	1.2	1,286.2	1,491.2	2,983.0	1,673.2	4,656.2
All species	2,284.8	511.1	387.8	3,183.6	26.0	--	178.6	1.6	1,294.4	1,500.5	3,002.0	1,682.1	4,684.1

1/ Factors for determining the amount of wood in each category are based on the Minnesota Utilization Study, 1990.

Rows and columns may not sum due to rounding.

Table 20.--Growing-stock removals from timberland for industrial roundwood by Forest Survey Unit, county, and species group, Minnesota, 1992

(In thousand cubic feet)

Unit and county	Balsam fir	Red-cedar	Tama-rack	Spruce	Jack pine	Red pine	White pine	N. white-cedar	Total soft-woods	Soft maple	Hard maple	White birch	Yellow birch	Hickory
ASPEN-BIRCH UNIT														
Carlton	752	--	5	157	253	175	27	--	1,369	86	18	959	(1/)	--
Cook	530	--	1	1,456	215	68	61	18	2,349	2	--	370	(1/)	--
Koochiching	2,106	--	47	3,795	991	483	100	242	7,763	2	1	107	(1/)	--
Lake	954	--	8	1,169	729	560	241	7	3,667	2	4	1,283	(1/)	--
St Louis	4,013	--	14	3,255	3,751	1,696	755	67	13,550	184	--	1,152	1	--
Total	8,355	--	75	9,831	5,938	2,981	1,184	334	28,699	276	23	3,872	2	--
CENTRAL HARDWOOD UNIT														
Anoka	--	--	--	--	--	1	1	--	2	--	--	--	--	--
Benton	--	--	--	--	--	57	(1/)	--	57	--	--	--	--	--
Carver	--	--	--	--	--	--	-	--	--	5	--	--	--	--
Chisago	--	--	--	--	--	2	(1/)	--	2	6	2	--	--	--
Dakota	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas	--	--	--	--	--	2	--	--	2	2	4	4	--	--
Fillmore	--	--	--	--	--	--	--	--	--	2	25	--	1	5
Goodhue	--	--	--	--	--	--	--	--	--	8	63	--	--	(1/)
Hennepin	--	--	--	--	--	3	--	--	3	8	3	--	--	--
Houston	--	--	--	--	--	--	--	--	--	9	55	1	2	30
Isanti	--	--	--	1	18	264	16	--	299	--	(1/)	--	--	--
Kanabec	--	--	--	--	2	2	3	--	8	7	14	(1/)	3	--
Le Sueur	--	--	--	--	--	--	--	--	--	9	1	--	--	--
Mille Lacs	3	--	--	1	267	291	280	--	842	10	7	1	--	--
Morrison	--	--	1	2	178	181	2	--	363	1	1	1	--	--
Olmsted	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Otter Tail	--	--	3	--	54	10	10	--	77	1	8	18	--	--
Pine	133	--	1	46	368	324	73	--	944	171	73	337	3	--
Rice	--	(1/)	--	--	--	--	--	--	(1/)	8	34	--	--	--
Scott	--	--	--	--	--	--	--	--	--	10	--	--	--	--
Sherburne	--	--	--	2	10	85	7	--	103	--	--	--	--	-
Stearns	--	--	4	--	--	5	--	--	9	15	7	4	--	--
Todd	--	--	2	--	8	6	6	--	22	11	1	10	--	--
Wabasha	--	--	--	--	--	--	--	--	--	43	11	(1/)	4	1
Washington	--	--	--	--	--	--	--	--	--	13	9	--	--	--
Winona	--	--	--	--	--	(1/)	--	--	(1/)	30	24	(1/)	--	(1/)
Wright	--	--	--	--	--	--	(1/)	--	(1/)	3	--	--	--	--
Total	135	(1/)	10	51	906	1,232	398	--	2,732	374	342	378	14	38

(Table 20 continued on next page)

(Table 20 continued)

Unit and county	Balsam fir	Red-cedar	Tama-rack	Spruce	Jack pine	Red pine	White pine	N. white-cedar	Total soft-woods	Soft maple	Hard maple	White birch	Yellow birch	Hickory
NORTHERN PINE UNIT														
Aitkin	439	--	(1/)	73	109	71	39	(1/)	731	146	39	209	(1/)	--
Becker	57	--	1	10	660	252	55	--	1,035	--	4	27	--	--
Beltrami	905	--	31	296	1,823	979	140	40	4,214	56	7	400	(1/)	--
Cass	480	--	--	121	2,776	1,197	201	8	4,783	41	24	531	(1/)	--
Clearwater	160	--	7	80	485	167	15	--	915	5	3	33	--	--
Crow Wing	46	--	1	3	1,128	374	36	--	1,587	4	4	51	--	--
Hubbard	38	--	1	41	2,223	663	65	(1/)	3,032	--	2	81	(1/)	--
Itasca	4,428	--	--	1,565	1,661	1,638	421	87	9,799	250	8	1,086	(1/)	--
Lake of the Woods	164	--	14	226	1,464	54	--	34	1,956	--	--	6	--	--
Mahnomen	--	--	--	--	4	--	--	--	4	--	1	2	--	--
Roseau	2	--	8	106	1,219	61	--	2	1,398	--	--	(1/)	--	--
Wadena	--	--	--	9	528	168	18	--	724	--	1	4	--	--
Total	6,718	--	64	2,531	14,080	5,624	989	172	30,178	503	93	2,430	1	--
PRAIRIE UNIT														
Blue Earth	--	--	--	--	--	--	--	--	--	9	(1/)	--	--	--
Brown	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay	--	--	--	--	(1/)	(1/)	--	--	1	--	--	1	--	--
Dodge	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Faribault	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Freeborn	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Grant	--	--	--	--	--	(1/)	--	--	(1/)	--	--	--	--	--
Jackson	--	--	--	--	--	--	--	--	--	(1/)	--	--	--	--
Kandiyohi	--	--	--	--	--	--	--	--	--	1	(1/)	(1/)	--	--
Kittson	--	--	--	--	--	--	--	--	--	--	5	--	--	--
Lyon	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Marshall	--	--	2	--	1	--	--	--	3	--	--	(1/)	--	--
Martin	--	--	--	--	--	--	--	--	--	--	6	--	--	--
McLeod	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Meeker	--	--	--	--	--	--	--	--	--	(1/)	(1/)	(1/)	--	--
Mower	--	--	--	--	--	1	--	--	1	--	--	--	--	--
Murray	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nicollet	--	--	--	--	--	--	--	--	--	34	7	--	--	--
Nobles	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Norman	--	--	--	--	--	--	--	--	--	4	--	--	--	--
Pennington	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pipestone	--	--	--	--	--	1	--	--	1	--	--	--	--	--
Polk	--	1	2	--	(1/)	(1/)	(1/)	--	3	--	--	(1/)	--	--
Pope	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Red Lake	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	17	11	--	--	--
Renville	--	--	--	--	--	--	--	--	--	26	17	--	--	--
Sibley	--	--	--	--	--	10	--	--	10	16	7	--	--	--
Steele	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Stevens	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Swift	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Waseca	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Wilkin	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow Medicine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	1	3	--	1	13	(1/)	--	19	108	55	2	--	--
State total	15,209	1	153	12,413	20,925	9,850	2,571	506	61,627	1,260	513	6,682	16	38

(Table 20 continued on next page)

(Table 20 continued)

Unit and county	Hack-berry	Ash	Black walnut	Cotton-wood	Balsam poplar	Aspen	Black cherry	Red oak group	White oak group	Bass-wood	Elm	Other hard-woods	Total hard-woods	All species
ASPEN-BIRCH UNIT														
Carlton	--	70	--	--	12	1,799	--	39	--	20	--	--	3,003	4,372
Cook	--	--	--	--	--	4,869	--	--	--	--	--	--	5,241	7,589
Koochiching	--	92	--	--	2,486	24,508	--	2	2	64	3	--	27,267	35,030
Lake	--	9	--	--	126	3,970	--	--	--	1	--	--	5,395	9,063
St Louis	--	119	--	--	1,579	31,815	--	19	--	113	2	--	34,985	48,535
Total	--	290	--	--	4,203	66,962	--	61	2	198	5	--	75,891	104,590
CENTRAL HARDWOOD UNIT														
Anoka	--	--	(1/)	--	--	2	(1/)	18	3	1	2	4	30	32
Benton	--	(1/)	--	--	--	33	--	4	(1/)	1	4	--	43	100
Carver	--	(1/)	--	27	--	1	--	7	9	(1/)	7	--	57	57
Chisago	--	7	--	--	--	4	--	30	14	18	(1/)	--	80	82
Dakota	--	--	--	5	--	--	--	2	(1/)	--	3	--	10	10
Douglas	--	29	2	4	--	6	--	67	18	42	5	--	183	185
Fillmore	--	17	12	1	--	5	2	417	212	110	50	11	870	870
Goodhue	--	14	5	14	--	7	2	227	76	89	3	--	507	507
Hennepin	--	5	1	40	--	6	--	10	8	5	7	--	92	95
Houston	11	12	7	54	--	8	4	1,141	414	179	67	7	2,001	2,001
Isanti	--	2	--	--	--	26	--	6	1	1	(1/)	--	36	335
Kanabec	--	29	--	--	6	1,452	--	157	31	93	1	--	1,792	1,800
Le Sueur	--	--	--	21	--	--	--	8	1	18	1	--	59	59
Mille Lacs	--	32	--	--	--	1,948	--	132	27	69	5	--	2,232	3,073
Morrison	--	7	--	--	--	971	--	62	15	12	6	--	1,076	1,439
Olmsted	--	--	1	5	--	--	3	73	16	8	1	30	136	136
Otter Tail	--	64	--	6	--	580	--	233	69	134	13	--	1,126	1,203
Pine	--	116	--	--	46	4,801	--	175	42	229	4	--	6,000	6,943
Rice	--	16	5	34	--	(1/)	--	103	37	42	24	--	303	303
Scott	--	8	--	78	--	1	--	13	19	--	11	--	141	141
Sherburne	--	--	--	--	--	(1/)	--	7	(1/)	--	(1/)	--	7	110
Stearns	--	21	2	55	--	32	--	81	49	44	20	3	333	341
Todd	--	72	(1/)	19	--	362	--	392	111	83	9	--	1,071	1,094
Wabasha	4	37	8	85	--	6	4	565	160	64	10	22	1,024	1,024
Washington	--	10	2	74	--	1	--	25	11	13	9	--	168	168
Winona	5	20	15	55	--	4	9	711	211	87	44	30	1,244	1,244
Wright	--	1	--	2	--	--	--	7	--	4	9	--	26	26
Total	20	520	61	578	53	10,256	24	4,670	1,553	1,345	314	107	20,646	23,378

(Table 20 continued on next page)

(Table 20 continued)

Unit and county	Hack-berry	Ash	Black walnut	Cotton-wood	Balsam poplar	Aspen	Black cherry	Red oak group	White oak group	Bass-wood	Elm	Other hard-woods	Total hard-woods	All species
NORTHERN PINE UNIT														
Aitkin	--	348	--	--	84	7,640	(1/)	343	29	300	5	(1/)	9,144	9,875
Becker	--	31	3	5	225	8,607	--	196	36	87	4	--	9,226	10,261
Beltrami	--	124	--	--	285	12,917	--	50	23	269	6	--	14,137	18,351
Cass	--	89	1	49	486	14,832	--	473	41	120	9	--	16,695	21,478
Clearwater	--	15	--	3	71	6,104	--	23	9	104	2	--	6,372	7,287
Crow Wing	--	44	--	--	--	6,046	--	391	30	59	--	--	6,630	8,218
Hubbard	--	7	--	--	204	7,833	--	41	5	19	(1/)	--	8,192	11,224
Itasca	--	302	--	--	933	27,789	--	144	15	675	2	--	31,204	41,003
Lake of the Woods	--	29	--	--	161	3,890	--	(1/)	--	(1/)	1	--	4,088	6,043
Mahnomen	--	6	--	1	12	1,438	--	11	3	56	--	--	1,529	1,533
Roseau	--	1	--	3	67	897	--	--	--	--	3	--	972	2,370
Wadena	--	12	--	3	--	687	--	41	3	7	--	--	757	1,481
Total	--	1,009	4	64	2,527	98,682	(1/)	1,713	193	1,694	33	(1/)	108,947	139,125
PRAIRIE UNIT														
Blue Earth	--	(1/)	3	19	--	--	--	7	2	21	1	--	63	63
Brown	--	3	--	5	--	--	--	--	1	10	--	--	18	18
Clay	--	2	--	35	--	1	--	2	(1/)	1	13	--	54	55
Dodge	--	--	--	(1/)	--	--	--	(1/)	--	(1/)	(1/)	--	1	1
Faribault	--	--	4	18	--	--	--	(1/)	--	3	1	--	27	27
Freeborn	--	--	--	29	--	--	--	2	--	--	1	--	32	32
Grant	--	1	--	(1/)	--	--	--	2	--	1	(1/)	--	4	4
Jackson	--	(1/)	(1/)	1	--	--	--	(1/)	--	--	--	--	2	2
Kandiyohi	--	5	(1/)	5	--	(1/)	(1/)	17	15	8	2	--	56	56
Kittson	--	--	--	--	--	--	--	--	--	--	--	19	24	24
Lyon	--	1	--	7	--	--	--	--	1	1	1	--	10	10
Marshall	--	(1/)	--	1	--	156	--	--	--	--	1	--	158	161
Martin	--	6	--	--	--	25	--	5	5	13	--	--	61	61
McLeod	--	9	--	4	--	2	--	3	7	2	4	--	29	29
Meeker	--	4	(1/)	7	--	2	1	10	13	10	4	--	53	53
Mower	--	--	--	1	--	--	--	4	5	--	1	--	11	12
Murray	--	--	--	13	--	--	--	--	--	--	2	--	15	15
Nicollet	--	11	3	113	--	--	--	36	10	69	6	3	292	292
Nobles	--	1	1	7	--	--	--	1	--	--	(1/)	--	11	11
Norman	--	1	--	21	--	300	--	(1/)	1	3	5	--	334	334
Pennington	--	--	--	--	--	349	--	--	--	--	--	--	349	349
Pipestone	--	1	--	--	--	--	--	1	--	--	--	--	2	4
Polk	--	--	--	49	(1/)	405	--	3	5	3	23	--	487	491
Pope	--	1	--	(1/)	--	(1/)	--	1	6	1	2	--	12	12
Red Lake	--	--	--	1	2	388	--	--	13	--	--	--	404	404
Redwood	--	17	3	109	--	--	--	20	10	17	10	--	215	215
Renville	--	22	7	150	--	--	--	30	14	24	15	--	305	305
Sibley	--	2	--	26	--	--	--	7	10	13	7	--	88	97
Steele	--	--	(1/)	(1/)	--	--	--	1	(1/)	--	(1/)	--	2	2
Stevens	--	(1/)	--	1	--	--	--	(1/)	--	--	1	--	2	2
Swift	--	--	--	--	--	--	--	--	(1/)	--	(1/)	--	1	1
Waseca	--	--	1	1	--	--	--	2	(1/)	--	1	--	5	5
Wilkin	--	--	--	29	--	--	--	--	--	--	--	--	29	29
Yellow Medicine	--	1	--	4	--	--	--	--	1	1	--	--	6	6
Total	--	87	23	658	2	1,629	1	156	119	201	101	22	3,165	3,184
State total	20	1,906	89	1,300	6,785	177,529	25	6,599	1,868	3,438	454	129	208,650	270,277

1/ Less than 500 cubic feet.

Table 21.--Sawtimber removals from timberland for industrial roundwood by Forest Survey Unit, county, and species group, Minnesota, 1992

(In thousand board feet) 1/

Unit and county	Balsam fir	Red-cedar	Tama-rack	Spruce	Jack pine	Red pine	White pine	N. white-cedar	Total swds.	Soft maple	Hard maple	White birch	Yellow birch	Hickory
ASPEN-BIRCH UNIT														
Carlton	1,756	--	14	370	965	940	152	--	4,196	197	91	3,402	(2/)	--
Cook	1,462	--	3	4,590	928	377	341	79	7,780	3	--	1,567	1	--
Koochiching	5,271	--	111	8,934	2,819	2,205	558	618	20,516	3	3	467	(2/)	--
Lake	2,447	--	19	3,074	2,715	2,595	1,343	29	12,222	3	7	4,418	2	--
St Louis	9,597	--	43	8,177	12,579	9,014	4,213	251	43,874	172	--	5,064	5	--
Total	20,533	--	189	25,146	20,005	15,131	6,607	978	88,589	380	100	14,918	9	--
CENTRAL HARDWOOD UNIT														
Anoka	--	--	--	--	--	6	5	--	11	--	--	--	--	--
Benton	--	--	--	--	--	317	2	--	319	--	--	--	--	--
Carver	--	--	--	--	--	--	--	--	--	25	--	--	--	--
Chisago	--	--	--	--	--	9	1	--	10	28	9	--	--	--
Dakota	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas	--	--	--	--	--	10	--	--	10	9	19	19	--	--
Fillmore	--	--	--	--	--	--	--	--	--	11	117	--	6	25
Goodhue	--	--	--	--	--	--	--	--	--	38	304	--	--	1
Hennepin	--	--	--	--	--	17	--	--	17	39	13	--	--	--
Houston	--	--	--	--	--	--	--	--	--	42	264	3	8	142
Isanti	--	--	--	2	43	1,253	89	--	1,388	--	1	--	--	--
Kanabec	--	--	--	--	6	9	19	--	34	33	72	1	19	--
Le Sueur	--	--	--	--	--	--	--	--	--	45	3	--	--	--
Mille Lacs	6	--	--	2	952	1,085	1,011	--	3,057	46	33	6	--	--
Morrison	--	--	4	4	744	1,008	10	--	1,769	5	7	6	--	--
Olmsted	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Otter Tail	--	--	11	--	176	53	57	--	297	5	37	87	--	--
Pine	313	--	4	106	1,428	1,532	405	--	3,789	293	358	1,383	19	--
Rice	--	2	--	--	--	--	--	--	2	37	164	--	--	--
Scott	--	--	--	--	--	--	--	--	--	48	--	--	--	--
Sherburne	--	--	--	4	28	307	35	--	374	--	--	--	--	--
Stearns	--	--	18	--	--	26	--	--	44	71	32	20	--	--
Todd	--	--	7	--	37	35	33	--	112	53	7	47	--	--
Wabasha	--	--	--	--	--	--	--	--	--	203	53	1	18	7
Washington	--	--	--	--	--	--	--	--	--	61	40	--	--	--
Winona	--	--	--	--	--	2	--	--	2	140	111	2	--	2
Wright	--	--	--	--	--	--	1	--	1	14	--	--	--	--
Total	320	2	43	119	3,413	5,669	1,669	--	11,234	1,245	1,642	1,575	70	177

(Table 21 continued on next page)

(Table 21 continued)

Unit and county	Balsam fir	Red-cedar	Tama-rack	Spruce	Jack pine	Red pine	White pine	N. white-cedar	Total swds.	Soft maple	Hard maple	White birch	Yellow birch	Hickory
NORTHERN PINE UNIT														
Aitkin	1,044	--	2	188	423	386	219	1	2,263	147	182	909	1	--
Becker	133	--	4	45	2,749	1,353	306	--	4,590	--	20	128	--	--
Beltrami	2,119	--	82	762	6,557	4,282	780	92	14,673	265	28	1,781	2	--
Cass	1,291	--	--	309	10,588	6,454	1,122	37	19,801	192	102	1,847	1	--
Clearwater	374	--	21	214	1,859	811	84	--	3,364	25	12	154	--	--
Crow Wing	114	--	6	7	4,375	1,908	199	--	6,608	14	12	187	--	--
Hubbard	89	--	6	145	9,065	3,388	354	1	13,049	--	10	364	1	--
Itasca	11,003	--	--	3,750	5,974	7,757	2,349	216	31,049	223	25	4,410	3	--
Lake of the Woods	383	--	44	545	3,932	290	--	148	5,342	--	--	28	--	--
Mahnomen	--	--	--	--	15	--	--	--	15	--	5	7	--	--
Roseau	4	--	35	286	3,289	333	--	10	3,957	--	--	2	--	--
Wadena	--	--	--	40	2,028	856	70	--	2,994	--	5	11	--	--
Total	16,554	--	199	6,290	50,854	27,820	5,483	504	107,705	866	401	9,829	7	--
PRAIRIE UNIT														
Blue Earth	--	--	--	--	--	--	--	--	--	41	2	--	--	--
Brown	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay	--	--	--	--	2	2	--	--	4	--	--	5	--	--
Dodge	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Faribault	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Freeborn	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Grant	--	--	--	--	--	1	--	--	1	--	--	--	--	--
Jackson	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Kandiyohi	--	--	--	--	--	--	--	--	--	7	2	2	--	--
Kittson	--	--	--	--	--	--	--	--	--	--	29	--	--	--
Lyon	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Marshall	--	--	7	--	4	--	--	--	11	--	--	1	--	--
Martin	--	--	--	--	--	--	--	--	--	--	30	--	--	--
McLeod	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Meeker	--	--	--	--	--	--	--	--	--	2	2	2	--	--
Mower	--	--	--	--	--	3	--	--	3	--	--	--	--	--
Murray	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nicollet	--	--	--	--	--	--	--	--	--	158	31	--	--	--
Nobles	--	--	--	--	--	--	--	--	--	4	--	--	--	--
Norman	--	--	--	--	--	--	--	--	--	19	--	--	--	--
Pennington	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pipestone	--	--	--	--	--	8	--	--	8	--	--	--	--	--
Polk	--	5	7	--	1	2	1	--	16	--	--	1	--	--
Pope	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Red Lake	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	81	53	--	--	--
Renville	--	--	--	--	--	--	--	--	--	123	80	--	--	--
Sibley	--	--	--	--	--	30	--	--	30	76	34	--	--	--
Steele	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Stevens	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Swift	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Waseca	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Wilkin	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow Medicine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	5	15	--	6	45	1	--	72	511	263	10	--	--
State total	37,407	6	446	31,555	74,278	48,666	13,759	1,482	207,600	3,002	2,406	26,332	86	177

(Table 21 continued on next page)

(Table 21 continued)

Unit and county	Hackberry	Ash	Black walnut	Cottonwood	Balsam poplar	Aspen	Black cherry	Red oak group	White oak group	Basswood	Elm	Other hardwoods	Total hardwoods	All species
ASPEN-BIRCH UNIT														
Carlton	--	267	--	--	21	4,956	--	164	--	29	--	--	9,129	13,325
Cook	--	--	--	--	--	12,939	--	--	--	--	--	--	14,510	22,291
Koochiching	--	398	--	--	4,408	69,879	--	10	8	301	8	--	75,486	96,003
Lake	--	29	--	--	218	10,844	--	--	--	2	--	--	15,522	27,745
St Louis	--	352	--	--	2,736	86,898	--	49	--	336	3	--	95,616	139,490
Total	--	1,046	--	--	7,384	185,516	--	223	8	668	11	--	210,264	298,853
CENTRAL HARDWOOD UNIT														
Anoka	--	--	1	--	--	8	(2)	76	11	4	11	17	129	140
Benton	--	2	--	--	--	91	--	17	2	6	16	--	135	454
Carver	--	2	--	125	--	3	--	31	39	1	35	--	260	260
Chisago	--	34	--	--	--	13	--	138	64	85	2	--	373	383
Dakota	--	--	--	29	--	--	--	8	1	--	13	--	51	51
Douglas	--	136	9	19	--	21	--	287	78	197	23	--	818	828
Fillmore	--	82	65	4	--	19	10	1,811	1,094	532	234	52	4,061	4,061
Goodhue	--	65	26	73	--	26	13	976	326	416	12	--	2,275	2,275
Hennepin	--	22	3	190	--	20	--	44	34	21	35	--	419	436
Houston	52	57	37	275	--	30	22	4,953	2,141	851	314	35	9,225	9,225
Isanti	--	7	--	--	--	73	--	24	5	4	2	--	116	1,503
Kanabec	--	153	--	--	11	4,994	--	692	147	484	5	--	6,610	6,645
Le Sueur	--	--	--	96	--	--	--	34	4	85	6	--	273	273
Mille Lacs	--	155	--	--	--	4,696	--	569	116	325	24	--	5,971	9,027
Morrison	--	34	--	--	--	2,973	--	265	65	55	27	--	3,436	5,205
Olmsted	--	--	6	22	--	--	19	313	69	43	6	139	617	617
Otter Tail	--	301	--	27	--	2,066	--	1,004	295	634	62	--	4,517	4,814
Pine	--	425	--	--	81	13,040	--	759	193	1,015	17	--	17,583	21,371
Rice	--	81	29	160	--	1	--	449	163	197	113	--	1,394	1,396
Scott	--	40	--	371	--	3	--	56	81	--	53	--	652	652
Sherburne	--	--	--	--	--	1	--	29	1	--	1	--	32	405
Stearns	--	106	8	259	--	93	--	356	217	208	92	15	1,477	1,521
Todd	--	337	2	91	--	1,425	--	1,705	477	392	40	--	4,578	4,690
Wabasha	20	177	39	408	--	21	19	2,434	689	302	45	104	4,542	4,542
Washington	--	49	10	348	--	5	--	118	54	64	42	--	790	790
Winona	24	97	83	279	--	12	44	3,069	917	420	206	139	5,545	5,547
Wright	--	5	--	9	--	--	--	29	--	20	42	--	119	120
Total	96	2,367	319	2,785	91	29,636	127	20,244	7,283	6,361	1,477	502	75,999	87,233

(Table 21 continued on next page)

(Table 21 continued)

Unit and county	Hack-berry	Ash	Black walnut	Cotton-wood	Balsam poplar	Aspen	Black cherry	Red oak group	White oak group	Bass-wood	Elm	Other hard-woods	Total hard-woods	All species
NORTHERN PINE UNIT														
Aitkin	--	1,528	--	--	163	21,032	(2/)	1,477	119	1,302	24	2	26,885	29,148
Becker	--	151	14	22	389	23,683	--	856	159	417	21	--	25,861	30,450
Beltrami	--	576	--	--	631	36,731	--	215	87	1,272	22	--	41,609	56,282
Cass	--	400	6	231	912	42,463	--	2,022	170	592	32	--	48,971	68,772
Clearwater	--	76	--	14	134	17,508	--	98	43	525	10	--	18,598	21,962
Crow Wing	--	224	--	--	--	17,167	--	1,674	134	315	--	--	19,727	26,334
Hubbard	--	26	--	--	425	22,370	--	164	21	90	1	--	23,472	36,521
Itasca	--	1,135	--	--	1,639	78,084	--	613	63	2,903	3	--	89,101	120,150
Lake of the Woods	--	138	--	--	640	12,554	--	2	--	1	5	--	13,368	18,710
Mahnomen	--	29	--	5	22	4,239	--	48	13	298	--	--	4,667	4,682
Roseau	--	4	--	12	201	2,784	--	--	--	--	16	--	3,018	6,975
Wadena	--	50	--	14	--	1,965	--	178	11	31	--	--	2,265	5,259
Total	--	4,337	20	299	5,156	280,580	(2/)	7,347	821	7,745	133	2	317,541	425,246
PRAIRIE UNIT														
Blue Earth	--	2	18	87	--	--	--	32	7	102	6	--	297	297
Brown	--	14	--	26	--	--	--	--	2	53	--	--	95	95
Clay	--	7	--	163	--	5	--	9	1	3	60	--	253	257
Dodge	--	--	--	2	--	--	--	1	--	2	1	--	6	6
Faribault	--	--	22	86	--	--	--	1	--	20	5	--	134	134
Freeborn	--	--	--	137	--	--	--	7	--	--	4	--	148	148
Grant	--	4	--	1	--	--	--	7	--	6	2	--	20	21
Jackson	--	1	1	5	--	--	--	1	--	--	--	--	9	9
Kandiyohi	--	26	2	23	--	1	1	72	65	39	10	--	249	249
Kittson	--	--	--	--	--	--	--	--	--	--	--	89	118	118
Lyon	--	4	--	31	--	--	--	--	2	4	4	--	45	45
Marshall	--	1	--	5	--	429	--	--	--	--	4	--	439	450
Martin	--	30	--	--	--	88	--	23	23	59	--	--	253	253
McLeod	--	42	--	18	--	7	--	14	29	11	16	--	137	137
Meeker	--	20	2	35	--	7	4	43	57	47	17	--	237	237
Mower	--	--	--	5	--	--	--	19	21	--	4	--	50	53
Murray	--	--	--	61	--	--	--	--	--	--	9	--	70	70
Nicollet	--	56	18	532	--	--	--	161	47	331	30	15	1,380	1,380
Nobles	--	4	4	34	--	--	--	3	--	--	2	--	49	49
Norman	--	3	--	100	--	819	--	1	3	15	24	--	984	984
Pennington	--	--	--	--	--	955	--	--	--	--	--	--	955	955
Pipestone	--	4	--	--	--	--	--	6	--	--	--	--	9	17
Polk	--	--	--	230	1	1,113	--	11	26	15	126	--	1,523	1,539
Pope	--	4	--	1	--	1	--	3	27	6	11	--	53	53
Red Lake	--	--	--	5	4	1,063	--	--	58	--	--	--	1,129	1,129
Redwood	--	86	13	515	--	--	--	88	45	82	47	--	1,009	1,009
Renville	--	108	36	705	--	--	--	131	59	114	71	--	1,426	1,426
Sibley	--	11	--	122	--	--	--	34	46	60	34	--	416	446
Steele	--	--	1	2	--	--	--	4	1	--	2	--	10	10
Stevens	--	1	--	4	--	--	--	1	--	--	4	--	9	9
Swift	--	--	--	--	--	--	--	--	1	--	1	--	2	2
Waseca	--	--	3	3	--	--	--	9	2	--	5	--	21	21
Wilkin	--	--	--	137	--	--	--	--	--	--	--	--	137	137
Yellow Medicine	--	3	--	21	--	--	--	--	2	3	--	--	29	29
Total	--	428	119	3,096	5	4,487	5	682	526	972	497	104	11,704	11,776
State total	96	8,179	458	6,180	12,636	500,219	132	28,496	8,637	15,746	2,118	607	615,508	823,108

1/ International 1/4-inch rule.

2/ Less than 500 board feet.

Table 22.--Harvest residues generated by industrial roundwood harvesting by Forest Survey Unit, county, and species group, Minnesota, 1992

(In thousand cubic feet)

Unit and county	Balsam fir	Red-cedar	Tama-rack	Spruce	Jack pine	Red pine	White pine	N. white-cedar	Total soft-woods	Soft maple	Hard maple	White birch	Yellow birch	Hickory
ASPEN-BIRCH UNIT														
Carlton	331	--	2	69	127	72	11	--	613	18	9	425	(1/)	--
Cook	247	--	(1/)	685	120	28	25	10	1,115	(1/)	--	183	(1/)	--
Koochiching	949	--	21	1,676	429	172	41	76	3,363	(1/)	(1/)	53	(1/)	--
Lake	349	--	4	484	170	129	99	4	1,238	(1/)	(1/)	615	(1/)	--
St. Louis	1,772	--	7	1,459	1,833	691	310	32	6,103	1	--	517	1	--
Total	3,647	--	34	4,373	2,679	1,091	486	122	12,432	18	10	1,793	1	--
CENTRAL HARDWOOD UNIT														
Anoka	--	--	--	--	--	(1/)	(1/)	--	1	--	--	--	--	--
Benton	--	--	--	--	--	23	(1/)	--	23	--	--	--	--	--
Carver	--	--	--	--	--	--	--	--	--	3	--	--	--	--
Chisago	--	--	--	--	--	1	(1/)	--	1	3	1	--	--	--
Dakota	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas	--	--	--	--	--	1	--	--	1	1	2	2	--	--
Fillmore	--	--	--	--	--	--	--	--	--	1	14	--	1	3
Goodhue	--	--	--	--	--	--	--	--	--	4	34	--	--	(1/)
Hennepin	--	--	--	--	--	1	--	--	1	5	2	--	--	--
Houston	--	--	--	--	--	--	--	--	--	5	30	(1/)	1	17
Isanti	--	--	--	(1/)	8	112	7	--	127	--	(1/)	--	--	--
Kanabec	--	--	--	--	1	1	1	--	3	4	6	(1/)	1	--
Le Sueur	--	--	--	--	--	--	--	--	--	5	(1/)	--	--	--
Mille Lacs	1	--	--	(1/)	(1/)	10	3	--	14	6	4	1	--	--
Morrison	--	--	1	1	89	74	1	--	166	1	1	1	--	--
Olmsted	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Otter Tail	--	--	1	--	10	4	4	--	20	1	4	10	--	--
Pine	59	--	(1/)	20	179	137	30	--	425	26	39	159	1	--
Rice	--	(1/)	--	--	--	--	--	--	(1/)	4	19	--	--	--
Scott	--	--	--	--	--	--	--	--	--	6	--	--	--	--
Sherburne	--	--	--	1	5	37	3	--	45	--	--	--	--	--
Stearns	--	--	2	--	--	2	--	--	4	8	4	2	--	--
Todd	--	--	1	--	5	3	2	--	11	6	1	6	--	--
Wabasha	--	--	--	--	--	--	--	--	--	24	6	(1/)	2	1
Washington	--	--	--	--	--	--	--	--	--	7	5	--	--	--
Winona	--	--	--	--	--	(1/)	--	--	(1/)	17	13	(1/)	--	(1/)
Wright	--	--	--	--	--	--	(1/)	--	(1/)	2	--	--	--	--
Total	60	--	6	22	297	405	51	--	842	139	186	182	6	21

(Table 22 continued on next page)

(Table 22 continued)

Unit and county	Balsam fir	Red-cedar	Tama-rack	Spruce	Jack pine	Red pine	White pine	N. white-cedar	Total soft-woods	Soft maple	Hard maple	White birch	Yellow birch	Hickory
NORTHERN PINE UNIT														
Aitkin	194	--	(1/)	33	40	29	16	(1/)	313	4	18	99	(1/)	--
Becker	25	--	1	6	362	104	22	--	521	--	2	15	--	--
Beltrami	399	--	14	135	921	331	57	11	1,868	31	3	206	(1/)	--
Cass	222	--	--	55	1,408	489	83	5	2,261	23	11	249	(1/)	--
Clearwater	71	--	3	37	257	67	6	--	441	3	1	18	--	--
Crow Wing	21	--	1	1	592	156	15	--	785	1	1	22	--	--
Hubbard	17	--	1	21	1,181	262	26	(1/)	1,507	--	1	43	(1/)	--
Itasca	1,990	--	--	695	803	595	173	26	4,282	(1/)	2	561	(1/)	--
Lake of the Woods	72	--	7	100	675	22	--	19	896	--	--	3	--	--
Mahnomen	--	--	--	--	2	--	--	--	2	--	1	1	--	--
Roseau	1	--	5	49	563	25	--	1	644	--	--	(1/)	--	--
Wadena	--	--	--	5	232	63	4	--	304	--	1	1	--	--
Total	3,011	--	31	1,137	7,037	2,145	402	63	13,825	62	41	1,219	(1/)	--
PRAIRIE UNIT														
Blue Earth	--	--	--	--	--	--	--	--	--	5	(1/)	--	--	--
Brown	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay	--	--	--	--	(1/)	(1/)	--	--	(1/)	--	--	1	--	--
Dodge	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Faribault	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Freeborn	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Grant	--	--	--	--	--	(1/)	--	--	(1/)	--	--	--	--	--
Jackson	--	--	--	--	--	--	--	--	--	(1/)	--	--	--	--
Kandiyohi	--	--	--	--	--	--	--	--	--	1	(1/)	(1/)	--	--
Kittson	--	--	--	--	--	--	--	--	--	--	3	--	--	--
Lyon	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Marshall	--	--	1	--	(1/)	--	--	--	1	--	--	(1/)	--	--
Martin	--	--	--	--	--	--	--	--	--	--	4	--	--	--
McLeod	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Meeker	--	--	--	--	--	--	--	--	--	(1/)	(1/)	(1/)	--	--
Mower	--	--	--	--	--	(1/)	--	--	(1/)	--	--	--	--	--
Murray	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nicollet	--	--	--	--	--	--	--	--	--	19	4	--	--	--
Nobles	--	--	--	--	--	--	--	--	--	(1/)	--	--	--	--
Norman	--	--	--	--	--	--	--	--	--	2	--	--	--	--
Pennington	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pipestone	--	--	--	--	--	1	--	--	1	--	--	--	--	--
Polk	--	1	1	--	(1/)	(1/)	(1/)	--	2	--	--	(1/)	--	--
Pope	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Red Lake	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	10	6	--	--	--
Renville	--	--	--	--	--	--	--	--	--	15	10	--	--	--
Sibley	--	--	--	--	--	4	--	--	4	9	3	--	--	--
Steele	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Stevens	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Swift	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Waseca	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Wilkin	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow Medicine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	1	2	--	1	6	(1/)	--	9	61	29	1	--	--
State total	6,717	1	73	5,533	10,014	3,647	940	185	27,109	280	266	3,196	8	21

(Table 22 continued on next page)

(Table 22 continued)

Unit and county	Hackberry	Ash	Black walnut	Cottonwood	Balsam poplar	Aspen	Black cherry	Red oak group	White oak group	Basswood	Elm	Other hardwoods	Total hardwoods	All species
ASPEN-BIRCH UNIT														
Carlton	--	29	--	--	6	718	--	36	--	2	--	--	1,243	1,856
Cook	--	--	--	--	--	1,675	--	--	--	--	--	--	1,857	2,973
Koochiching	--	44	--	--	1,201	11,140	--	2	2	36	1	--	12,479	15,843
Lake	--	3	--	--	61	1,659	--	--	--	1	--	--	2,338	3,576
St. Louis	--	32	--	--	761	13,757	--	6	--	31	(1/)	--	15,108	21,211
Total	--	108	--	--	2,029	28,949	--	45	2	70	1	--	33,025	45,458
CENTRAL HARDWOOD UNIT														
Anoka	--	--	(1/)	--	--	1	(1/)	17	3	(1/)	1	2	25	26
Benton	--	0	--	--	--	15	--	4	0	1	2	--	22	45
Carver	--	0	--	15	--	(1/)	--	7	9	(1/)	4	--	39	39
Chisago	--	3	--	--	--	2	--	25	11	10	(1/)	--	55	56
Dakota	--	--	--	2	--	--	--	2	(1/)	--	2	--	6	6
Douglas	--	16	1	2	--	3	--	65	18	24	3	--	138	138
Fillmore	--	9	6	(1/)	--	3	1	400	166	59	28	6	697	697
Goodhue	--	8	3	6	--	4	1	221	74	50	1	--	406	406
Hennepin	--	3	(1/)	23	--	3	--	10	8	3	4	--	59	60
Houston	6	6	3	26	--	5	2	1,096	325	99	37	4	1,663	1,663
Isanti	--	1	--	--	--	12	--	5	1	(1/)	(1/)	--	20	147
Kanabec	--	13	--	--	3	539	--	146	23	44	1	--	780	783
Le Sueur	--	--	--	12	--	--	--	8	1	10	1	--	37	37
Mille Lacs	--	18	--	--	--	508	--	129	26	39	3	--	733	748
Morrison	--	4	--	--	--	417	--	60	15	7	3	--	508	674
Olmsted	--	--	1	3	--	--	1	71	16	3	1	17	112	112
Otter Tail	--	36	--	3	--	215	--	228	67	75	7	--	646	666
Pine	--	46	--	--	22	1,958	--	169	37	91	2	--	2,551	2,976
Rice	--	8	2	19	--	0	--	97	35	23	13	--	220	221
Scott	--	5	--	43	--	1	--	13	18	--	6	--	91	91
Sherburne	--	--	--	--	--	0	--	7	0	--	0	--	7	52
Stearns	--	11	1	31	--	15	--	75	46	24	11	2	230	234
Todd	--	40	0	11	--	116	--	376	108	47	5	--	716	727
Wabasha	2	20	4	46	--	3	2	550	156	35	5	12	871	871
Washington	--	5	1	42	--	1	--	21	9	7	5	--	102	102
Winona	3	11	7	28	--	2	4	690	202	46	24	17	1,064	1,064
Wright	--	1	--	1	--	--	--	7	--	2	5	--	17	17
Total	11	265	29	312	25	3,823	11	4,496	1,373	699	176	60	11,815	12,657

(Table 22 continued on next page)

(Table 22 continued)

Unit and county	Hack-berry	Ash	Black walnut	Cotton-wood	Balsam poplar	Aspen	Black cherry	Red oak group	White oak group	Bass-wood	Elm	Other hard-woods	Total hard-woods	All species
NORTHERN PINE UNIT														
Aitkin	--	165	--	--	41	3,220	(1/)	335	23	134	3	(1/)	4,042	4,355
Becker	--	17	2	3	108	3,820	--	187	32	47	2	--	4,236	4,757
Beltrami	--	62	--	--	141	5,871	--	49	18	149	2	--	6,533	8,401
Cass	--	40	1	28	236	6,616	--	449	34	63	3	--	7,751	10,011
Clearwater	--	8	--	2	35	2,792	--	22	8	52	1	--	2,942	3,383
Crow Wing	--	22	--	--	--	2,696	--	378	28	26	--	--	3,173	3,959
Hubbard	--	3	--	--	100	3,426	--	36	5	11	(1/)	--	3,624	5,132
Itasca	--	121	--	--	451	12,219	--	138	14	330	(1/)	--	13,837	18,119
Lake of the Woods	--	16	--	--	87	1,942	--	(1/)	--	(1/)	1	--	2,050	2,946
Mahnomen	--	3	--	1	6	671	--	11	3	25	--	--	721	723
Roseau	--	(1/)	--	1	35	435	--	--	--	--	2	--	474	1,117
Wadena	--	6	--	2	--	314	--	40	3	4	--	--	369	673
Total	--	463	2	36	1,239	44,020	(1/)	1,645	168	840	14	(1/)	49,751	63,576
PRAIRIE UNIT														
Blue Earth	--	(1/)	1	10	--	--	--	7	2	11	1	--	38	38
Brown	--	1	--	3	--	--	--	--	1	4	--	--	9	9
Clay	--	1	--	20	--	1	--	2	(1/)	(1/)	7	--	32	32
Dodge	--	--	--	0	--	--	--	(1/)	--	(1/)	(1/)	--	1	1
Faribault	--	--	2	10	--	--	--	(1/)	--	1	1	--	14	14
Freeborn	--	--	--	16	--	--	--	2	--	--	(1/)	--	18	18
Grant	--	(1/)	--	(1/)	--	--	--	2	--	1	(1/)	--	3	3
Jackson	--	(1/)	(1/)	1	--	--	--	(1/)	--	--	--	--	1	1
Kandiyohi	--	3	(1/)	3	--	(1/)	(1/)	16	15	5	1	--	44	44
Kittson	--	--	--	--	--	--	--	--	--	--	--	11	13	13
Lyon	--	(1/)	--	4	--	--	--	--	1	(1/)	(1/)	--	6	6
Marshall	--	(1/)	--	1	--	69	--	--	--	--	(1/)	--	70	72
Martin	--	4	--	--	--	13	--	5	5	7	--	--	38	38
McLeod	--	5	--	2	--	1	--	2	6	1	2	--	19	19
Meeker	--	2	(1/)	4	--	1	(1/)	10	13	6	2	--	39	39
Mower	--	--	--	1	--	--	--	4	5	--	(1/)	--	10	11
Murray	--	--	--	7	--	--	--	--	--	--	1	--	8	8
Nicollet	--	5	2	64	--	--	--	33	8	37	3	2	176	176
Nobles	--	(1/)	(1/)	4	--	--	--	1	--	--	(1/)	--	6	6
Norman	--	(1/)	--	12	--	132	--	(1/)	1	1	3	--	151	151
Pennington	--	--	--	--	--	154	--	--	--	--	--	--	154	154
Pipestone	--	(1/)	--	--	--	--	--	1	--	--	--	--	2	2
Polk	--	--	--	27	(1/)	180	--	3	2	1	9	--	223	225
Pope	--	(1/)	--	(1/)	--	(1/)	--	1	6	1	1	--	10	10
Red Lake	--	--	--	1	1	172	--	--	13	--	--	--	186	186
Redwood	--	9	2	60	--	--	--	20	10	10	6	--	132	132
Renville	--	11	3	84	--	--	--	30	13	13	8	--	188	188
Sibley	--	1	--	15	--	--	--	6	9	7	4	--	53	58
Steele	--	--	(1/)	(1/)	--	--	--	1	(1/)	--	(1/)	--	2	2
Stevens	--	(1/)	--	(1/)	--	--	--	(1/)	--	--	(1/)	--	1	1
Swift	--	--	--	--	--	--	--	--	(1/)	--	(1/)	--	(1/)	(1/)
Waseca	--	--	(1/)	(1/)	--	--	--	2	(1/)	--	1	--	4	4
Wilkin	--	--	--	16	--	--	--	--	--	--	--	--	16	16
Yellow Medicine	--	(1/)	--	2	--	--	--	--	1	(1/)	--	--	4	4
Total	--	45	11	369	1	724	1	147	111	107	53	12	1,673	1,682
State total	11	881	42	716	3,295	77,516	12	6,334	1,654	1,716	244	73	96,264	123,373

1/ Less than 500 cuboc feet.

Table 23.--Residue produced at primary wood-using mills by type of material, type of use, and Forest Survey Unit, Minnesota, 1992

(In thousand tons, green weight)

Unit and type of use	Wood residue						Bark	
	Total		Coarse 1/		Fine 2/			
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
ASPEN-BIRCH UNIT								
Fiber products	33.03	13.16	33.03	13.16	(4/)	--	--	4.90
Charcoal	0.01	0.01	0.01	0.01	--	--	--	--
Industrial fuel-mill	2.46	12.92	0.04	9.25	2.42	3.67	43.23	175.13
Industrial fuel-sold	9.37	26.49	2.48	9.55	6.89	16.94	11.94	88.13
Domestic fuel	3.71	2.42	3.70	2.41	0.01	0.01	0.85	0.68
Miscellaneous 3/	2.26	5.85	0.04	2.06	2.23	3.79	(4/)	5.63
Not used	8.78	5.46	2.14	2.94	6.65	2.52	9.76	8.01
Total	59.62	66.31	41.42	39.38	18.19	26.93	65.77	282.48
CENTRAL HARDWOOD UNIT								
Fiber products	2.31	2.67	2.31	2.67	--	--	0.06	0.24
Charcoal	0.01	0.03	0.01	0.03	--	--	0.01	0.01
Industrial fuel-mill	3.20	19.65	2.18	12.86	1.02	6.80	13.65	27.83
Industrial fuel-sold	1.79	15.55	0.14	7.44	1.65	8.11	0.06	0.46
Domestic fuel	2.01	33.74	2.01	33.65	(4/)	0.09	1.50	5.46
Miscellaneous 3/	0.64	31.09	--	7.70	0.64	23.39	--	18.89
Not used	2.47	1.59	1.21	0.34	1.27	1.25	0.78	1.03
Total	12.44	104.32	7.86	64.67	4.58	39.64	16.05	53.92
NORTHERN PINE UNIT								
Fiber products	122.43	58.92	122.43	57.87	--	1.05	0.20	7.77
Charcoal	0.24	0.40	0.24	0.40	--	--	0.10	0.17
Industrial fuel-mill	55.38	8.25	3.14	5.53	52.24	2.72	56.91	201.41
Industrial fuel-sold	23.98	101.68	5.30	51.20	18.68	50.48	19.72	114.85
Domestic fuel	10.42	32.12	10.27	30.91	0.15	1.21	2.91	8.73
Miscellaneous 3/	6.47	7.14	1.18	0.13	5.29	7.01	0.45	0.09
Not used	15.54	36.86	6.33	10.09	9.21	26.77	6.70	11.67
Total	234.47	245.38	148.89	156.13	85.57	89.25	86.99	344.71
PRAIRIE UNIT								
Industrial fuel-mill	--	0.04	--	0.04	--	--	--	0.01
Industrial fuel-sold	--	2.09	--	2.09	--	--	--	--
Domestic fuel	0.09	2.64	0.08	2.61	0.01	0.03	(4/)	0.64
Miscellaneous 3/	0.01	9.82	--	4.87	0.01	4.96	--	2.96
Not used	0.03	2.07	--	0.94	0.03	1.13	0.02	0.88
Total	0.13	16.66	0.08	10.54	0.05	6.12	0.02	4.48
ALL UNITS								
Fiber products	157.77	74.75	157.77	73.70	(4/)	1.05	0.26	12.91
Charcoal	0.26	0.44	0.26	0.44	--	--	0.10	0.18
Industrial fuel-mill	61.03	40.86	5.36	27.67	55.67	13.18	113.78	404.38
Industrial fuel-sold	35.15	145.81	7.92	70.28	27.23	75.53	31.71	203.45
Domestic fuel	16.23	70.93	16.06	69.57	0.17	1.35	5.26	15.51
Miscellaneous 3/	9.39	53.91	1.21	14.75	8.17	39.15	0.46	27.56
Not used	26.83	45.98	9.68	14.31	17.15	31.67	17.27	21.59
Total	306.66	432.66	198.26	270.72	108.39	161.95	168.84	685.59

1/ Suitable for chipping such as slabs, edgings, veneer cores, etc.

2/ Not suitable for chipping such as sawdust, veneer clippings, etc.

3/ Livestock bedding, mulch, small dimension, and speciality items.

4/ Less than 10 tons green weight.

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Hackett, Ronald L.; Dahlman, Richard A.
1997. **Minnesota timber industry—an assessment of timber product output and use, 1992.** Resour. Bull. NC-186. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 60 p.

In 1992, volume of industrial roundwood products removed from Minnesota's forest totaled 392 million cubic feet—14 percent more than in 1990. Mill byproducts generated from primary manufacturers decreased 2 percent to 1,595 thousand tons, green weight. Almost all plant residues were used, primarily for fuel and fiber products. Pulpwood was the leading roundwood product at 203 million cubic feet, saw logs ranked second at 59 million cubic feet, and veneer logs were third with 3 million cubic feet. The number of primary processing mills increased from 572 in 1990 to 596 in 1992. Total receipts increased 13 percent to 264 million cubic feet.

KEY WORDS: Roundwood, pulpwood, saw logs, veneer logs, residues.

Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it. As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.